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RESEARCH INSTITUTE, NEW DELHI

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PROCEEDINGS  
OF THE  
SCIENTIFIC MEETINGS  
OF THE  
ZOOLOGICAL SOCIETY  
OF LONDON  
FOR THE YEAR  
1879.

(P L A T E S.)

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PROCEEDINGS  
OF THE  
SCIENTIFIC MEETINGS  
OF THE  
ZOOLOGICAL SOCIETY OF LONDON.

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January 14, 1879.

Prof. Newton, M.A., F.R.S., V.P., in the Chair.

The Chairman opened the proceedings of the meeting with the following remarks :—

“ Before we proceed to this evening’s business, I think all present will deem it only fitting that your Chairman should say a few words in regard to the loss we have suffered by the death of our President since we last met. I am sure there was no Fellow of the Society who took a livelier or deeper interest in its welfare than did the late Lord Tweeddale; and if proof of this assertion seem to any one wanting, I have but to refer to the facts that he was not merely content with giving us the countenance of his high social position, not merely content with presiding at our Council Meetings and discharging the formal duties of the office he bore amongst us, but that he actively participated in our scientific work, as witness the valuable and carefully elaborated papers with which he from time to time enriched our publications, the last of which you will hear read tonight. I believe I am right in saying that since these Scientific Meetings were established, we have never had a President who was so well, so intimately, known to the majority of the Fellows who attend them, or one who was so competent to appreciate the papers read or the communications made at them; and this, I need not point out to you, has been of great benefit to us. Of Lord Tweeddale’s life and labours I shall say

nothing. I hope they may be duly recounted by some one far more fitted than myself to do them justice; but for my own part I wish to express an opinion, in which all present I think will join, that the active sympathy which our late President invariably exhibited, not only for those who busied themselves in that branch of study especially affected by himself, but for all working zoologists, requires acknowledgment on the present occasion; and in these imperfect sentences I have endeavoured to give it utterance."

The Secretary read the following report on the additions to the Society's Menagerie during the month of December 1878.

The total number of registered additions to the Society's Menagerie during the month of December was 80, of which 42 were by presentation, 33 by purchase, and 5 were received on deposit. The total number of departures during the same period, by death and removals, was 111.

The most noticeable additions during the month of December were as follows:—

1. A dark-coloured Lemur new to the Society's collection, which appears to be the Mayotte Lemur (*Lemur mayottensis*, Schl.).

2. A collection of Lemurs brought to England by Mr. George A. Shaw, who has been resident some years at Fianarantsoa, in the province of Betsileo, in Central Madagascar, and acquired by the Society partly by purchase and partly by presentation. Amongst these are representatives of two species new to the Society's collection—one being a *Chirogaleus*, and the other *Microcebus smithi*—besides an example of the little-known *Hapalemur simus*. Mr. Shaw has favoured me with some interesting notes upon these little-known animals, which will be read at a future meeting, when I hope to be able to give the exact name of the *Chirogaleus*, if determinable with our existing knowledge.

3. A female Punjaub Wild Sheep (*Ovis cycloceros*), presented by Col. W. R. Alexander, having been obtained in the hills between Upper Sind and Beloochistan.

Dr. Traquair exhibited a specimen of *Alectorænas nitidissima*, an extinct Pigeon of Mauritius, belonging to the Museum of Science and Art of Edinburgh.

Prof. Newton made the following remarks upon this specimen:—

"Dr. Traquair deserves the best thanks of those present for having been at the trouble of bringing to London and exhibiting here the specimen of *Alectorænas nitidissima* now on the table. It had been believed that but two skins of this species existed—one in the Museum at Paris, the other in that of Port Louis, the capital of Mauritius. It was therefore with extreme pleasure that, on the 26th of September last, when Dr. Traquair was kindly showing me over the Museum of Science and Art in Edinburgh, I recognized in one of the cases the third example, now before you.

"The true history of this beautiful and ill-fated species may be told in a very few words. It would take a long time to recount and re-

fute the numerous fictions that have been heaped upon the only available facts. The bird was sufficiently well described and figured by Sonnerat in his 'Voyage aux Indes orientales' (ii. p. 175, pl. 101) as coming from the Île de France, and was named by him the *Pigeon hollandais*—a name given, I suspect, not so much from the former inhabitants of the island, as from its plumage exhibiting the colours of the Dutch flag (red, blue, and white). Two examples obtained by him found their way to the Museum of Paris, where Temminck (Hist. Pig. ed. 2, i. p. 50, pl. 19) seems to have seen them at the beginning of the present century, their plumage very much the worse, he says, for the fumes (of sulphuric acid, as M. Alphonse Milne-Edwards informs me) to which they had been exposed. In 1790, Bonnaterre, describing the species afresh, but apparently from the same specimens, said of it (Encycl. Méth. p. 233), and probably with truth:—'On le trouve fréquemment à l'île de France.' In or about 1816 the University of Edinburgh became possessed of what has long been known as the 'Dufresne Collection,' from the French naturalist of that name, who was originally (as I learn from M. A. Milne-Edwards) a dealer in Natural-History specimens, and had also been for some time Conservator of the Cabinet of Natural History belonging to the Empress Joséphine, but in 1815 or the following year entered the Museum of Paris as Aide-Naturaliste. In which capacity it was that he parted with the collection obtained by the University of Edinburgh I cannot say; but that collection contained the specimen of this Pigeon, now before you, as the label affixed to it shows<sup>1</sup>; and it remained the property of the University until a few years ago, when it was transferred to the newly established Museum of Science and Art at Edinburgh. This brings me to the end of my facts.

"It is a very unpleasant task to expose the blunders of other naturalists; but I am sorry to say that few authors subsequent to Sonnerat and Bonnaterre have referred to this species without making some mistake about it. In one very conspicuous case this mistake can scarcely have been otherwise than intentional. The misstatements of Le Vaillant are notorious; but I do not know a more unblushing instance of his mendacity than his circumstantial account of the *Ramier herissé*, as he called this species (Ois. d'Afr. vi. p. 74). It naturally misled all succeeding authors, until his assertions respecting this bird were concisely summed up by Sundevall (Krit. Framställn. p. 53) in the sentence 'quæ omnia inter fabulas numeranda sunt.' But Sundevall did not seem to have suspected that the species was extinct; nor perhaps had any one else, until Mr. Edward Newton, during his residence in Mauritius between 1859 and 1878, became convinced that such was the case. He indeed once hoped (Ibis, 1861, p. 277) that he had heard of it; but further inquiry proved the bird meant by his informant to be *Trocaza meyeri*; and the only trace of

<sup>1</sup> "The inscription, as I copied it at the time, ran:—'The Hackled Pigeon. *Ptilinopus nitidissimus*, Scop. sp. Locality Isle of France. *Columba Frœncie Dufresne*.' On the bottom of the stand was written, 'R-d Hackled Pigeon, 219, *Columba Frœncia* Linn.'"

its former existence in the island that he met with was the stuffed skin which, as I have already said, is in the Museum there.

"Coming to later authors, Mr. G. R. Gray, who, in 1840, had proposed (List Gen. B. p. 58) the generic separation of this pigeon from others of the family under the name of *Alectranas* (which, as Agassiz subsequently pointed out, should be written *Alectoranas*), in 1855 marked it as represented in the British Museum (Cat. Gen. B. p. 97); and so it appeared in his 'Hand-list' (ii. p. 228); but I have not been able to find that the British Museum ever possessed a specimen, and no mention is made of it in his 'List of Specimens' of *Columbæ* of 1856. In 1868 MM. Pollen and Van Dam entered this species (Rech. Faune de Madag. p. 159) as belonging to Madagascar alone, without even giving it a place in the Mauritian list; and in 1877 Dr. Hartlaub, in his most recent work (Vög. Madag. u. s. w. p. 264), though his other statements are right enough, was misled into the error of saying that 'Fossile Reste dieser Art sammelte Herr Henry H. Slater.'

"Allied to *Alectoranas nitidissima* are three species which still survive and are natives of Madagascar, the Comoros, and the Seychelles. All have been treated by Dr. Hartlaub as congeneric; and they will probably stand as *A. madagascariensis* (Linn.), *A. szanzini* (Verr.), and *A. pulcherrima* (Scop.). It is possible that Rodriguez once possessed another member of the group, the *Columba rodericana* of M. A. Milne-Edwards; but we have not received sufficient remains of that species (which is certainly extinct) to decide the point, and the older voyagers give us no help here as they do in so many other cases. I shall not trouble you with commenting on the nomenclature of any of these species. That which is the subject of my remarks has had a sufficient number of useless synonyms applied to it; but on the whole they have all been fortunate, and there is no difficulty in determining the names they should bear, though both the generic and specific appellation of *Alectoranas nitidissima* were conferred by writers who had never set eyes on a specimen.

"To conclude, I may state (1) that there is no trustworthy evidence of *Alectoranas nitidissima* having inhabited any other locality than Mauritius, to which it was therefore in all probability peculiar, (2) that it is now wholly extinct, and (3) that remains of only three specimens are known to have been preserved."

The following extract was read from a letter addressed by Commodore Hoskins, of H.M.S. 'Wolverine,' dated Sydney, Oct. 9, 1878, to Capt. Evans, C.B., Hydrographer to the Admiralty:—

"It is some time since you asked me to obtain for Mr. Slater of the Zoological Society information as to the northern limit of the 'Mooruk,' and whether it is found in New Ireland.

"I instructed Lieut. Horne, commanding the 'Sandfly,' to do all in his power to solve the point; and I have just heard from him at Brisbane (which he reached on his way down just from the islands) that, having taken Mr. Brown, the Wesleyan Missionary, and some native interpreters on board in Blanche Bay, he proceeded to visit the

whole of the south coast of New Ireland, communicating constantly with the natives and anchoring in many of the bays, and that nowhere could he find any traces of the bird or learn that it exists. On the contrary, the natives seemed quite ignorant of all that concerns it, and offered to buy some eggs, which had been brought from New Britain in order to facilitate inquiries on the subject.

"P.S. Mr. Brown says the native name in New Britain is *Moorup* not *Mooruk*."

---

The following extract was read from a letter addressed to the Secretary by the Rev. G. Brown, C.M.Z.S., dated Port Hunter, Duke-of-York group, Sept. 7, 1878:—

"About three weeks ago H.M.S. 'Sandfly,' Capt. A. G. Horne, arrived here on her way to the extreme end of New Ireland. Capt. Horne told me that he had instructions from the Commodore to inquire as to whether the 'Moorup' was found on New Ireland or not. He asked me about it; and I told him that, so far as we knew, it was not found on any part of the west coast, but that we knew little or nothing of the east side of the island. Capt. Horne very kindly asked me to accompany them on their cruise; and as I was not at all well, and as I also wished very much to examine the coast further north, I very gladly accepted his offer. We were away about twelve days from here, and went as far as the north end of Sandwich Island, but did not reach New Hanover; nor did we visit the east coast of New Ireland at all. We anchored at Wood Harbour, on the mainland opposite Sandwich Island. We saw no traces of the Moorup—neither eggs, feathers, nor bones, all of which are used by the natives of New Britain—the feathers for head-dresses, and the bones for the ends of their spears. Of these we saw no signs, however, in New Ireland. We had a Moorup's egg with us, and showed it everywhere; but no one seemed to recognize it. I think we may be very certain that neither the Moorup nor the Cockatoo are found on New Ireland. There is much more open country on the east side of the island; but all the natives assure us that they are not found there either."

---

The Secretary read the following extract from a letter addressed to him by Mr. R. Trimen, F.Z.S., dated South-African Museum, Cape Town, 25th Sept. 1878:—

"With respect to your *Plectropterus niger*<sup>2</sup>, I have ascertained that all the four specimens were brought down from Zanzibar by Capt. Garrett, of the mail-steamer 'Kafir.' Two were given to General Sir A. Cunynghame, who afterwards sent them to the Society, and the other two to Mr. W. G. Brounger. One of the latter two, while on Mr. Brounger's farm at Constantia, was shot; and the survivor subsequently disappeared, Mr. Brounger believing that it flew away."

---

The following papers were read:—

<sup>1</sup> [*Casuarus bennetti*, see above.—P. L. S.]

<sup>2</sup> See figure and description, P. Z. S. 1877, p. 47, pl. vii.

I. Remarks upon the Habits and Change of Plumage of Humboldt's Penguin. By A. D. BARTLETT, Superintendent of the Society's Gardens.

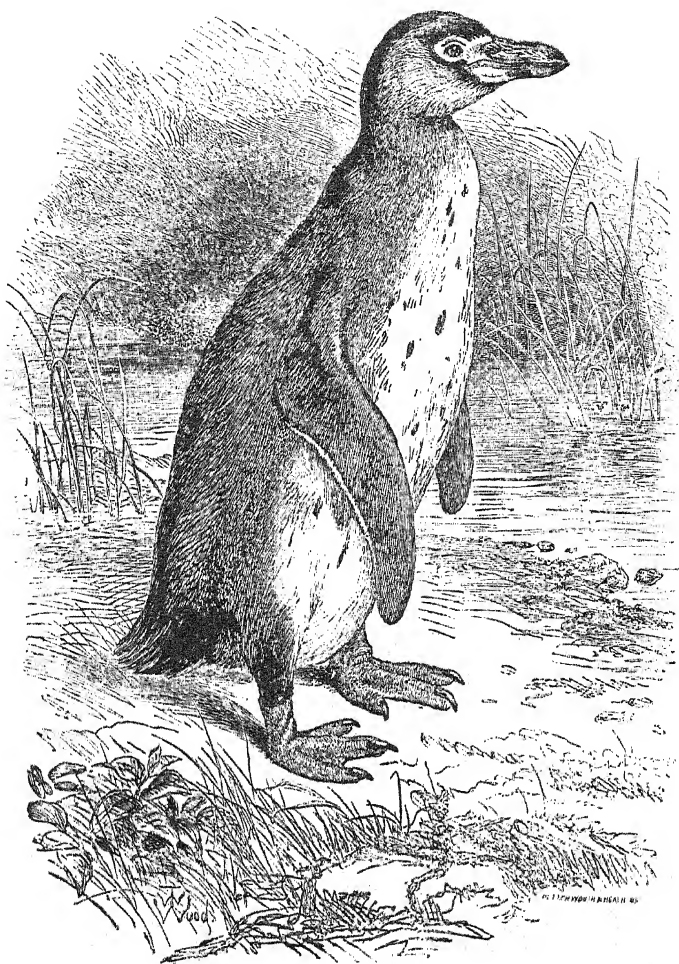
[Received November 13, 1878.]

On the 24th of January, 1878, a specimen of Humboldt's Penguin (*Spheniscus humboldti*) was purchased from a dealer in Liverpool. The bird was in poor condition when received, and very dirty, but perfectly tame, following one about, and seeming pleased to be taken on the lap and nursed like an infant. At first it required to be fed by hand; for if its food was placed on the ground the bird took no notice of it, although hungry. After a few days, if living fishes were thrown to it and the bird saw them jumping about on the floor, it began to pick up the fishes and swallow them. From this and from the colour and condition of its plumage, I have no doubt that the bird had been reared from the nest, and had never previously fed itself.

It was some days before the Penguin ventured into the water; but after the first wash the bird rapidly improved: the feathers became clean; its appetite increased; and it passed much time in the water, evidently gaining strength and weight. About this time it frequently uttered its loud braying jackass-like notes, and became fat and in full vigour. Figure 1 (p. 7) gives a very faithful representation of the bird at this time. About the 22nd of February, the bird appeared dull, and with half-closed eyes moped about: it became ill-tempered and spiteful, bit at any one who offered to touch it, and avoided going into the water. The bird looked larger than before, its feathers standing out from its body during this condition; but its appetite continued good, and it fed as freely as usual.

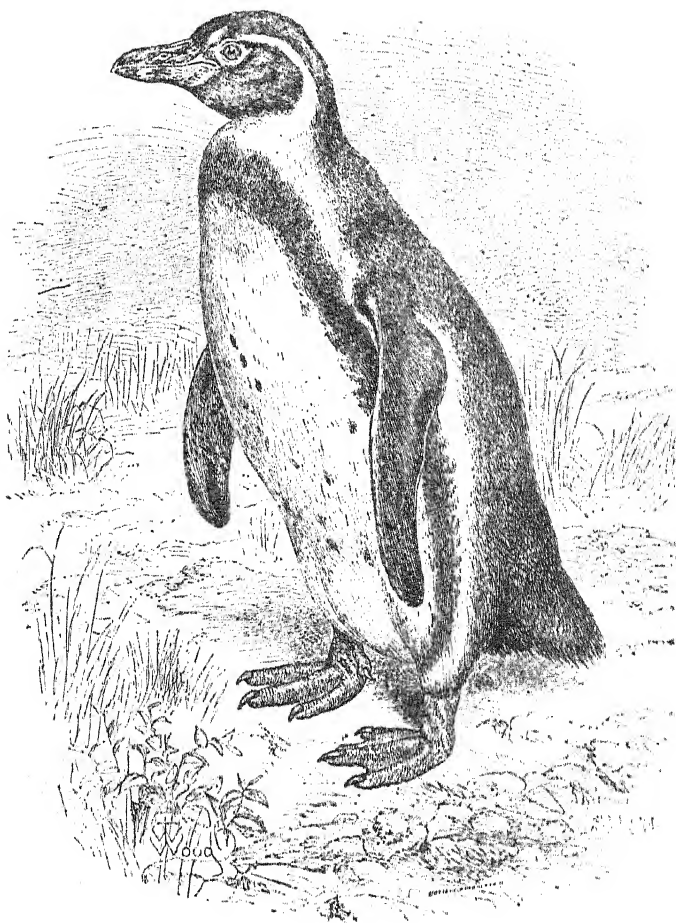
In a few days the feathers began to fall off from all parts of the bird, not, as birds usually moult, a few feathers at a time, but in large quantities: for instance, the bird generally remained stationary during the night, and in the morning there was left round it a circle of cast feathers that had been shed during the night. So rapidly did the process of moulting go on, that by the 7th of March the bird had entirely renewed its plumage, and appeared in the adult dress, as represented in figure 2 (p. 8). The manner in which the flipper-like wings cast off the short scale-like feathers was remarkable: they flaked off like the shedding of the skin of a serpent; the new feathers being already plainly visible, the old feathers were pushed off by the new ones; this was very clearly noticeable, as many of the old feathers could be seen still attached to the tips of the new feathers, so that the bird was entirely covered with its new plumage before the old feathers dropped off. The bird had by these means entirely changed its dress and appearance in certainly less than ten days. It looked thinner on account of the shortness of its new feathers, and doubtless from a decrease in bulk, consequent upon the rapid deve-

Fig. 1.



*Spheniscus humboldti* (before moult).

Fig. 2.

*Spheniscus humboldti* (after moult).



loping of the entire plumage. The bird avoided the water for a few days before it began to moult, and also after it had renewed its feathers; it soon, however, became lively, its eyes assumed their usual form and brightness, it took freely to the water, in which it passed the greater part of the day. Its movements in the water when swimming, diving, and pursuing fish were most extraordinary; it seemed, as it were, to fly under water, using its flipper-like wings after the fashion of a Seal.

The Penguin appears so much at home in the water, so perfectly adapted to an aquatic life, that one would conclude that, but for the necessity of breeding and moulting, this bird would be far more at home on the ocean than in passing even a short period on land, being so ill-adapted in form for travelling on shore.

## 2. On a Collection of Birds made by Mr. Hübner on Duke-of-York Island and New Britain. By OTTO FINSCH, Ph.D. C.M.Z.S.

[Received November 20, 1878.]

From the Museum Godeffroy at Hamburg I have received a collection of the birds of Duke-of-York Island and the adjoining parts of New Britain, sent over by Mr. Hübner. Although through the zealous efforts of the Rev. George Brown, we are pretty well acquainted with the fauna of Duke-of-York Island, especially with its ornithology, on which Dr. Selater has published some valuable papers, I think the following paper will form a not uninteresting contribution to our knowledge.

The present collection contains 52 species from Duke-of-York Island, and 7 from New Britain, 14 being new to the former group, namely *Haliaëtus leucogaster*, *Hirundo javanica*, *Cuculus canorus*, *Scythrops novæ-hollandiæ*, *Macropygia doreya*, *Strepsilas interpres*, *Esacus magnirostris*, *Sterna bergii*, *St. longipennis*, *Procellaria neglecta*, *Pr. leucoptera*, *Puffinus leucomelas*, *P. tenuirostris*, and *Dysporus sula*.

Except the native names, Mr. Hübner has given me no notices; I therefore can only copy these, reminding you that the pronunciation of them is according to the German language.

### *From Duke-of-York Island.*

#### 1. PANDION LEUCOCEPHALUS, Gould.

*P. haliaëtus*, Sci. Proc. Zool. Soc. 1877, p. 108.

Native name *Teringau*, Hübner.

Male and female of this apparently constantly smaller species or race of our common Osprey.

<sup>1</sup> "On the Birds collected by Mr. George Brown on the Duke-of-York Island, and on the adjoining parts of New Ireland and New Britain," P. Z. S. 1877, pp. 96-114; on a second collection, ib. 1878 p. 289; and on a third, ib., p. 670.

2. *Haliaetus leucogaster* (Gm.).

Native name *Manigulai*, Hübner.

One male. This widely distributed species is not mentioned in Dr. Selater's list of the birds of Duke-of-York Island.

3. *Haliastur girrenera* (Vieill.); Selat. *l. c.* p. 109.

Native name *Bakubukup*; iris brown; feeds on lizards, Hübner.

Two old birds (male and female) and a young one.

4. *Dendrochelidon mystacea* (Less.); Sel. *l. c.* p. 105.

Native name *Netin*, Hübner.

Male and female.

5. *Hirundo javanica*, Sparrin.

Native name *Pinipinagra*, Hübner.

One male. It agrees well with a Javan specimen; but the underparts are of a little darker brownish, and the outermost tail-feather shows only a pale indication of the white cross band on the inner web, so well marked in the Javan bird.

6. *Eurystomus crassirostris*, Sel. *l. c.* p. 106.

Native name *Kalangbabareta*, Hübner.

One specimen (female).

7. *Alcedo moluccensis*, Bl.; Sel. *l. c.* p. 105.

Native name *Nangia*, Hübner.

One old and one young bird.

8. *Halcyon sanctus*, Vig. & Horsf.; Sel. *l. c.* p. 105.

Native name *Ganare*, Hübner.

Male and female.

9. *Halcyon saurophagus*, Gould.

*H. albicilla*, Sel. *l. c.* p. 105.

Native name *Kenetam*, Hübner.

One female, with white head and underparts, like the male.

10. *Tanysiptera nigriceps*, Sel. *l. c.* p. 105.

Native name *Loklakaulia*, Hübner.

One specimen corresponding exactly with Dr. Selater's description.

11. *Merops ornatus*, Lath.; Sel. *l. c.* p. 105.

One specimen.

12. *Nectarinia aspasia*, Less.; Sel. *l. c.* p. 102.

Native name *Nalange*, Hübner.

Two old males; the crown of one of a golden green, of the other more steel-green, and nearly the same as the metallic-green of the rump; one shows some pale yellow feathers on the vent, no doubt remnants of the young plumage; and one female.

13. *NECTARINIA FRENATA*, S. Müll.; *Sci. l. c.* p. 103.

Native name *Nalange-labuan*, Hübner.

One male.

14. *PHILEMON COCKERELLI*, *Sci.*; *Sci. l. c.* p. 104.

Native name *Garuk*, Hübner.

Male and female, exactly alike, of this excellent new species.

15. *MONARCHA ALECTO*, Temm.; *Sci. l. c.* p. 100.

*Piezorhynchus rufolateralis*, Gray, ♀.

Native name *Nolor* (♂ and ♀), Hübner.

One male and two females, exactly like specimens from Halmahera (Gilolo).

16. *RHIPIDURA TRICOLOR*, Vieill.

*Sauloprocta melaleuca*, Quoy, *Sci. l. c.* p. 99.

Native name *Napali*, Hübner.

Male and female alike, exactly agreeing with specimens from Mysol and Aru.

17. *RHIPIDURA SETOSA*, Quoy et Gaim.; *Sci. l. c.* p. 99.

Native name *Torotorotumbuan*, Hübner.

Male and female.

18. *LALAGE KARU*, Less.; *Sci. l. c.* p. 101.

Native name *Nakior*, Hübner.

Male and female. The male has the upper portion of the rump pure white, the lower portion black with greyish-white tips, giving a wavy appearance; the upper tail-coverts are brownish grey. The female has the upper parts, including the rump, umber-brown instead of black; the rufous tinge on the vent and lower tail-coverts is paler.

19. *CALORNIS NITIDA*, Gray; *Sci. l. c.* p. 104.

*C. viridescens*, Gray, *P. Z. S.* 1858, p. 181.

Native name *Nallowut*, Hübner.

Male and female, both exactly alike, and one young male, with plumage beneath furnished with dark longitudinal stripes.

In size and coloration (distribution and lustre of the green and violet-purplish), I see not the slightest difference in specimens from New Guinea (Dorey).

Al. in.	Caud. in. lin.	Rostr. lin.	
4	3 6	7	♂ ad., Duke of York.
4	3 4	7	„ Dorey.

20. *NASITERNA PUSTO*, *Sci.*; *Sci. l. c.* p. 108.

Native name *Pinipinatan*, Hübner.

Male and female, exactly alike.

21. *PIONIAS CYANICEPS* (Puch.).

*Geoffroius cyaniceps*, *Scl. l. c.* p. 107, et 1878, p. 672.

Native name *Binibia*, Hübner.

One male, but no doubt a young one, as the head is still green and has no blue collar. I took this distinct species formerly for the female of *P. heteroclitus*, Homb. r.

22. *ELECTUS POLYCHLORUS*, Scop. ; *Scl. l. c.* p. 106.

*E. linnæi*, Wagl. (♀).

Native name *Kalangi*, Hübner.

Three green males, agreeing exactly with specimens from Gilolo, wings 9 to 9½ inches, and two red females, wings 8" 6''' to 8" 8''' (also called *Kalangi* by the natives), exactly agreeing with the so-called *E. linnæi*, Wagl.

As Mr. Hübner apparently has sexed the specimens himself, his collection gives new evidence that Dr. Meyer was right in declaring the red ones to be the females of the green.

23. *TRICHOGLOSSUS SUBPLACENS*, *Scl.* ; *Scl. l. c.* p. 108.

Native name *Nebir*, Hübner.

Two males and one female, agreeing exactly with Dr. Sclater's description.

24. *CUCULUS CANORUS*, L.

One specimen, *in size, colour, and markings exactly agreeing with specimens from Germany.*

25. *CUCULUS INSUPERATUS*, Gould ; *Scl. l. c.* p. 106.

*C. sonnerati* (pt.), Schl.

Native name *Neciu*, Hübner.

One male specimen, agreeing with Javan specimens, but breast and vent washed only very faintly with rufous, and larger. Wings 4" 9''' , tail 4" 9''' .

26. *EUDYNAMIS PICATA*, S. Müll. ; *Scl. l. c.* p. 106.

Native name, male, *Bakebake*; female, *Avarik*, Hübner.

Male and female.

After what the Marquis of Tweeddale has said (*Ibis*, 1869, p. 342) on the difficulties of making out what is the true "*picata*" of Solomon Müller, I follow in the determination of this species Dr. Sclater, leaving it aside whether this Koel must bear Müller's name or that of *rufiventris*, Less.

The male, altogether black, with blue lustre, agrees perfectly with Australian ones (*E. cyanocephala*), but is smaller; the female differs totally from the New-Holland one, and comes nearest to *E. malayana*, Cab., from Java. On a black-greenish shining ground-colour, the upper parts are streaked longitudinally on the head, spotted on back and wing-coverts, and barred on wings and tail with rusty brown; chin and throat are black, spotted thickly with rusty; on the gape a white longitudinal stripe; underparts of

a whitish-rusty ground-colour, more tinged with rusty on the lower throat and under tail-coverts, with distinct black cross bands much narrower than the white interspaces. Bill in both sexes greyish horn-yellow, with base of upper jaw dark.

27. *SCYTHROPS NOVÆ-HOLLANDIÆ*, Lath.

Native name *Guloko*, Hübner.

Male and female. Not recorded by Dr. Selater.

28. *EDIRHINUS INSOLITUS*, Schleg.; *Scl. l. c.* p. 110.

*Edirhinus globifer*, Cab. et Rehnw. Journ. f. Ornithol. 1877, tab. iv.

Native name *Tambun*, Hübner.

Male and female of this remarkable Pigeon, both alike, and with the curious *Carpophaga*-like knob on front; the male has the chin tinged faintly with bluish green.

29. *CARPOPHAGA RHODINOLÆMA*, *Scl.\* (?)*

Native name *Gurkambu*, Hübner.

Male and female, precisely alike.

Dr. Selater enumerates from Duke-of-York Island *C. van-wyckii*, Cass. The only description of it (*Proc. Acad. Sci. Philad.* xiv. 1862, p. 320) I cannot refer to, this periodical being wanting in our library. In leaving it open whether the specimens before me belong to this species or not, I find, however, that they agree very well with the above-named species, originally described by Dr. Selater from the Admiralty Islands (*P. Z. S.* 1877, p. 555). The specimens are mostly near allied to *C. pacifica*; but the head, neck, and underparts are grey, only the sides of head, chin, and throat washed with rosy or vinous; a ring round the eye white, as pointed out in Dr. Selater's description. Wings in male 9" 5", in female 8" 9".

30. *CARPOPHAGA RUBRICERA*, Bp.; *Scl. l. c.* p. 109.

Native name *Guré*, Hübner.

Male and female; both alike.

31. *MACROPYGIA DOREYA*, Bp. *Consp. Av.* ii. p. 57.

? *M. carteretia*, *Scl. l. c.* p. 111.

Native name *Tokuo*, Hübner.

One old male, in bad condition, which I refer to this dark-billed species, and not to *M. carteretia*, Bp., as in that the bill is said to be yellow. *M. nigrirostris*, Salvad., which Dr. Selater also enumerates among the birds of Duke-of-York Island, seems, according to his measurements, considerably smaller.

32. *CHALCOPHAPS STEPHANI*, Puch.; *Scl. l. c.* p. 111.

Native name *Nauvat*, Hübner.

Male and female, differing as noticed by Dr. Selater.

\* See remarks by Mr. Selater, March 4th, *infra*.

33. *CAECENAS NICOBARICA*, L. ; *Scl. l. c.* p. 112.

Native name *Parreparre*, Hübner.

Male and female, agreeing with specimens from the Moluccas.

34. *MEGAPODIUS EREMITA*, Hartl. *P. Z. S.* 1867, p. 830 (Echiquier Islands).

*M. hoeskeri*, Cab. et Rehnw. *Journ. f. Orn.* 1876, p. 326 (New Hanover) ; *Scl. l. c.* p. 113 (Duke-of-York Island).

*M. rubrifrons*, *Scl. P. Z. S.* 1877, p. 556 (Admiralty Islands).

Native name *Kakiau*, Hübner.

Male and female in size and coloration alike. Wings 8" 6". In dried skins: tarsus brownish (in the female more yellowish brown towards the knee); toes and nails brownish black.

Dr. Salvadori, to whom I forwarded the type specimen from the Museum Godeffroy for comparison, pronounces (*in litt.*) the three species referred to above undoubtedly inseparable from each other, and identical with Hartlaub's type from Echiquier Islands.

35. *ARDEA SACRA*, Gmel. ; *Scl. l. c.* p. 112.

Native name *Ambar*, Hübner.

One female, in slate-black plumage.

36. *ARDEA FLAVICOLLIS*, Lath. ; *Scl. l. c.* p. 113.

Native names, male *Nakak*, female *Ambar*, young *Kakuk*, Hübner.

Old male, female, and young bird. The old male agrees perfectly with a Malaccan one. Wings 8"; female, wings 7" 8".

I do not think that a specific separation of the Australian *A. gouldi*, Bp., on account of the larger size, is exactly to be relied upon.

37. *NYCTICORAX CALEDONICUS*, Gmel. ; *Scl. l. c.* 1878, p. 673.

Native name *Anglema*, Hübner.

Two males; wings 9" 9".

38. *STREPSILAS INTERPRES*, L.

Native name *Aulic*, Hübner.

One specimen.

39. *ESACUS MAGNIROSTRIS*, Geoff.

Native name *Kalabibil*, Hübner.

One male. New for this locality.

40. *CHARADRIUS FULVUS*, Gmel. ; *Scl. l. c.* p. 113.

Native name *Natewabun*, Hübner.

Two specimens; one with the underparts black intermixed with some white feathers.

41. *NUMENIUS UROPYGIALIS*, Gould ; *Scl. l. c.* p. 113.

Native name *Kakang*, Hübner.

Male and female. All the Eastern specimens have the rump strongly barred, and apparently deserve specific separation.

42. *ACTITIS INCANA* (Gmel.) ; *Scl. l. c.* p. 113.

Native name *Fuvik*, Hübner.

One specimen.

43. *ACTITIS HYPOLEUCA* (L.) ; *Scl. l. c.* p. 113.

Native name *Fuvia*, Hübner.

Two specimens.

44. *STERNA BERGII*, Licht.

Native name *Aururepika*, Hübner.

One specimen, a not full-grown fledgling.

45. *STERNA LONGIPENNIS*, Nordin.

Native name *Ganaibowo*, Hübner.

Two old males, agreeing in every respect with Baikal specimens.

46. *STERNA FULIGINOSA*, Gmel. ; *Scl. l. c.* p. 113.

Native name *Ganaiboro*, Hübner.

One young bird.

47. *ANOUS STOLIDUS* (L.) ; *Scl. l. c.* p. 113.

Native name *Ganaiboro*, Hübner.

One old specimen.

48. *PROCELLARIA NEGLECTA*, Schleg. *Mus. P.-B. Procell.* p. 10.

Native name *Ururu*, Hübner.

One specimen.

Mr. Salvin, to whom I sent the specimen for comparison, kindly writes to me :—"Compared with a specimen of *Procellaria neglecta*, Schl., in my collection from the Kermadec Islands, the head is a little lighter ; and it has rather more white on the base of the wing-feathers than a specimen from the same collection as the type of *P. neglecta*, Schl. The bill slightly longer. Not otherwise different in my opinion."

As the white basal portion of the plumage, so conspicuous chiefly on the inner web of wings, is not mentioned by Prof. Schlegel, and on account of the rarity of this species, I think it better to give a full description.

In form this species, with its stout bill, seems nearest allied to *P. fuliginosa*, Kuhl. On account of the mottled appearance the specimen looks like an immature bird ; and the suggestion may be allowed that the old bird will have the head, neck, and underparts uniform white.

Head, neck, and under surface white, nearly all the feathers washed at the tips with pale brownish, giving the head above, the neck, and the sides of the body a pale brown wash ; front, sides of head, throat, and middle of the underparts more pure and uniform white ; under tail-coverts brown, with white basal portion ; back, shoulders, wing-coverts, and remainder of upper parts dark brown, each feather white at the basal half, some of the shoulder- and smaller wing-

coverts worn off at the tips, and therefore with paler margins : wings dark brown, like the back, over the greater portion of the inner web pure white ; shafts, to about the apical third, also white ; wings from below white, tipped with brown, as are the under wing-coverts ; tail-feathers dark brown, the basal portion of the inner web white ; bill black ; feet pale, the toes and webs black to about the apical third.

Long. tot. in.	Al. in.	Caud. in. lin.	Rostr.		Tars. lin.	Dig. med. lin.
			culm. lin.	alt. lin.		
c. 15	10	3 7	14	6	17½	21

#### 49. PROCELLARIA LEUCOPTERA, Gould.

Native name *Laguna-kikina*, Hübner.

One specimen.

On this Mr. Salvin also gives me the following kind remarks :—  
“ Your specimen from Duke-of-York Island is certainly *Estrelata leucoptera*, Gould, of which I have a typical specimen, obtained from Gould himself. Your bird is slightly clearer, greyer on the back and rump, and has a more slender bill at the base, the difference being very little indeed.”

The well-marked dark (nearly black) cross band on the rump, which Prof. Schlegel does not mention, induced me to believe it might be new ; but as our first authority with respect to *Procellariidae* tells me that I am wrong, I cannot do better than follow him.

#### 50. PUFFINUS LEUCOMELAS, Temm.

Native name *Kitai*, Hübner.

One specimen, exactly like specimens from Amboina.

#### 51. PUFFINUS TENUIROSTRIS, Temm. ; Finsch, Journ. f. Orn. 1874, p. 210.

Native name *Kipohi*, Hübner.

One specimen, agreeing exactly with the figure in the ‘ Fauna Japonica ’ (tab. 86).

#### 52. DYSPORUS SULA (L.).

*Sula fusca*, Vieill.

Native name *Manemantoura*, Hübner.

Three specimens, among them a nearly uniformly brown young bird.

*From New Britain.*

#### 1. CORVUS ENCA, Horsf.

*Corvus*, sp. inc., *Scl. l. c.* p. 104.

Native name *Garnik*, Hübner.



One specimen, which I am not able to distinguish from a Javan one, as the differences in size are very slight.

Al.	Caud.	Rostr.	Tars.	
in. lin.	in. lin.	lin.	lin.	
11 9	5 6	23	23	New Britain.
11 3	5 11	23	25	Java.

2. *GRACULA KREFFTI*, *Scl. l. c.* p. 104.

Native name *Giljan*, Hübner.

Male and female, showing no differences.

The figure given with the original description (*P. Z. S.* 1869, pl. ix.) shows, in contrast to the description, the upper and lower tail-coverts yellow instead of white, and gives therefore quite a wrong idea; only the middle of the vent near the anal region is yellow (orange-yellow).

3. *BUCEROS RUFICOLLIS*, Vieill.; *Scl. P. Z. S.* 1878, p. 672.

Native name *Ngal*, Hübner.

One old and one young female (sex marked by Mr. Hübner) both having the whole head and neck uniform black, like the body. The old female shows on the basal half of the culmen five strongly developed plicæ, the basal one measuring 17 lines in length and 18 in diameter, being flat from above; the young one lacks the plicæ, and shows only a small elevated (about 6''') flat casque, 2'' 4''' in length and 16''' in diameter.

4. *PLICTOLOPHUS OPHTHALMICUS* (*Scl.*).

*Cacatua ophthalmica*, *Scl. P. Z. S.* 1877, p. 107.

Native name *Moal*; iris brown, Hübner.

Male and female alike.

5. *DOMICELLA HYPÆNOCHROA*, Gray.

*Lorius hypænochrous*, *Scl. l. c.* p. 108.

Native name *Kulinga*, Hübner.

Two specimens, which have been kept in confinement.

6. *CENTROPUS ATERALBUS*, Less.; *Scl. l. c.* p. 106.

Native name *Kumkum*, Hübner.

One old male. The white "speculum" on the wings is formed by the tectrices of the primaries, which are white; the white of head and neck is washed pale ochre-yellowish. Al. 8'', caud. 10'', rostr. a front. 17''', tars. 21'''.

7. *CARPOPHAGA SPILORRHOA*, Gray; *Scl. l. c.* p. 109.

Native name *Ngelangele*, Hübner.

One specimen.

Dr. Sclater enumerates this species from Duke-of-York Island.

3. On a Collection of Crustacea made by Capt. H. C. St. John, R.N., in the Corcan and Japanese Seas. By EDWARD J. MIERS, F.L.S., F.Z.S.—Part I. Podophthalmia. With an Appendix by Capt. H. C. St. John.

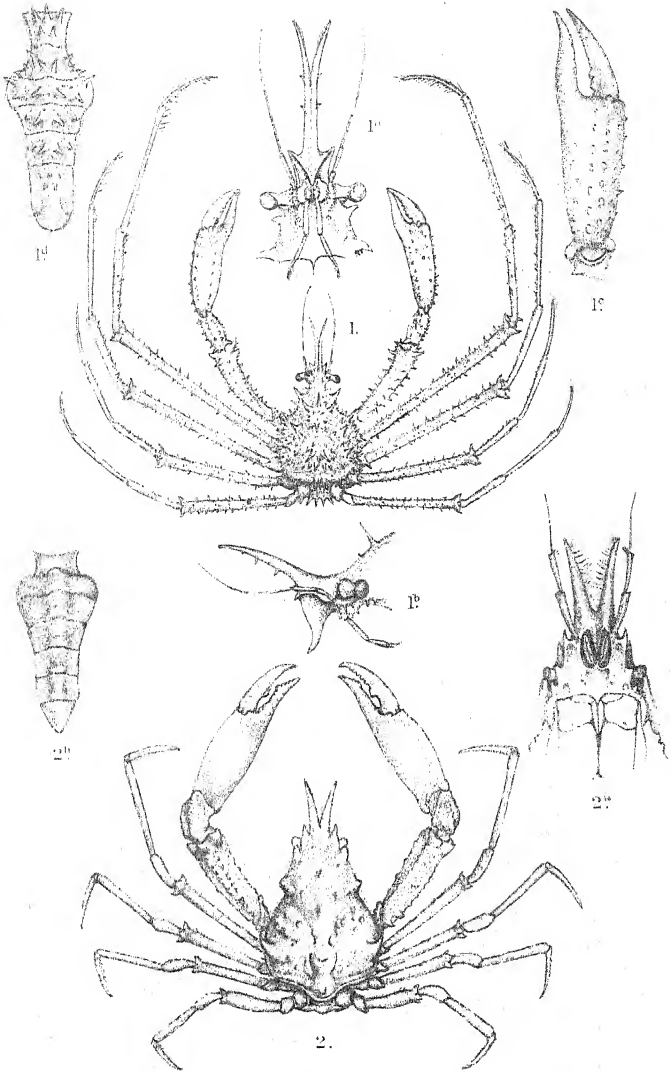
[Received November 23, 1878.]

(Plates I.—III.)

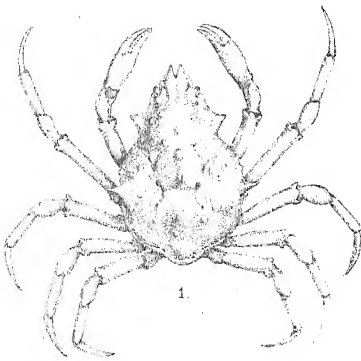
The collections of Crustacea made by Capt. H. C. St. John while engaged in surveying the Japanese coasts between the years 1870 and 1877 have been presented by Dr. J. Gwyn Jeffreys, F.R.S., to the Trustees of the British Museum, and are of so much interest, both from the geographical distribution of the species and on account of the many novelties collected, that I have thought it desirable to bring an account of them before the Society. The specimens were nearly all obtained by dredging; and Capt. St. John has furnished an interesting account of the mode adopted by him in collecting and separating the specimens, which is printed below as an Appendix. But few of the larger and well-known littoral species, which are so well described and figured by De Haan in his standard work upon the Crustacea of Japan (in Siebold, 'Fauna Japonica,' 1833-50), are represented in the collection.

Comparatively little was known of the Crustacean fauna of the deeper waters of this region until the publication, in 1857-60, of a series of papers by the late Dr. W. Stimpson, the eminent American carcinologist, on the Decapoda collected by the U.S. Expedition to the North Pacific under Commanders C. Ringgold and J. Rodgers, in the 'Proceedings of the Philadelphia Academy of Sciences,' which contain short Latin diagnoses of a large number of new species (many of them obtained at considerable depths), and in which also a considerable number of species previously described by Milne-Edwards, Dana, Adams and White, and others are added to the Japanese fauna. It is much to be regretted that no fuller account of these collections should ever have appeared, and that Stimpson's preliminary report did not extend beyond the Decapoda. As Capt. St. John's collections were made in the same region, many of Stimpson's species occur in them; and in their determination I have been greatly aided by comparing them with a series of specimens from the Japanese Seas, named by Dr. Stimpson himself, and presented some years ago by the Smithsonian Institution to the British Museum.

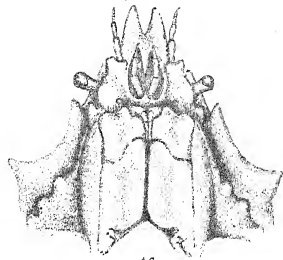
It is remarkable, under the circumstances, that the present collection should contain so many forms which are new to science, while so many of Stimpson's species still remain *desiderata* to the national collection; and this goes far to prove that a rich harvest will yet reward the collector of marine Invertebrata in the Japanese region, and that even more interesting results may be expected in many regions where no dredging-operations have yet been attempted. The



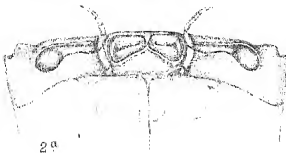




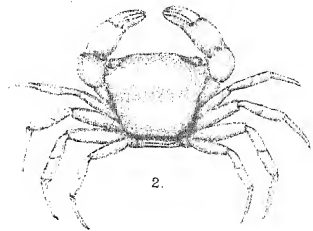
1.



1<sup>a</sup>



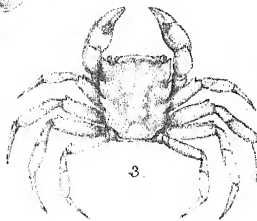
2<sup>a</sup>



2.



3<sup>a</sup>



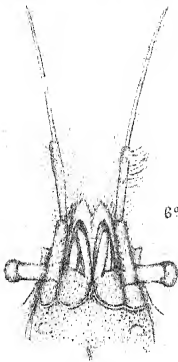
3.



2<sup>b</sup>



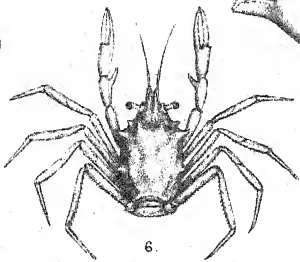
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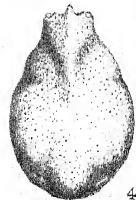
6<sup>a</sup>



4<sup>a</sup>



6.

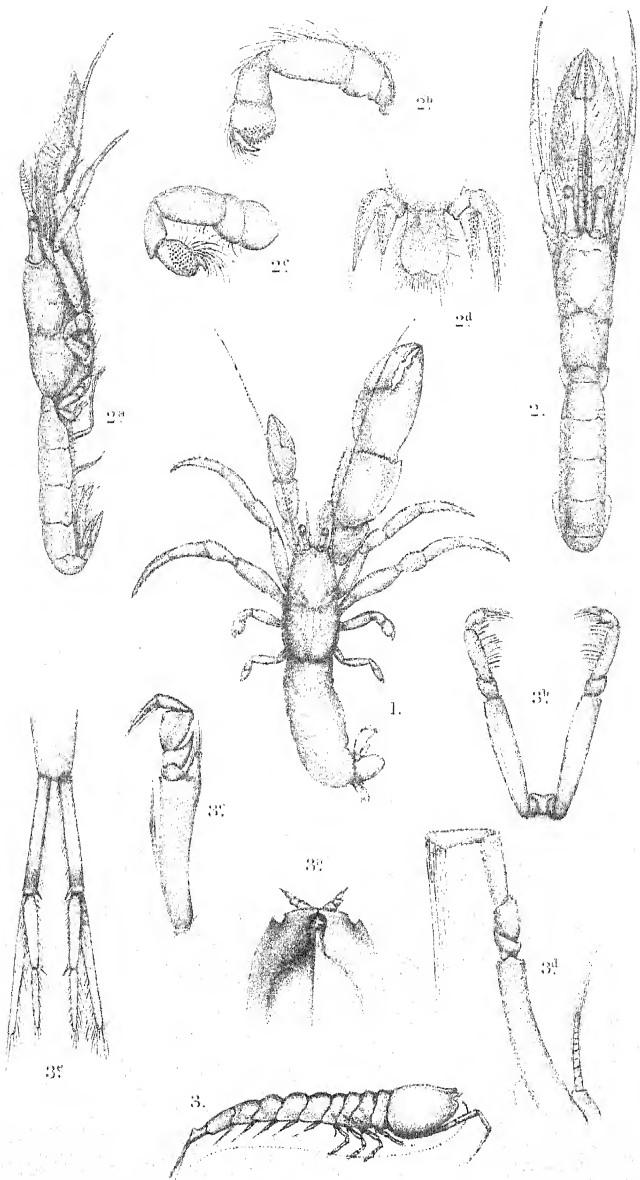


4.



6<sup>b</sup>









careful manner in which the exact particulars regarding the locality, depth, and, in some cases, the temperature of the water have been recorded by Capt. St. John gives additional scientific value to the present collection; and although it is to be regretted that the labels belonging to a few of the bottles had unfortunately been washed off and lost before the collection was received by the Trustees, yet Capt. St. John assures me that all these specimens were collected in or near the Corean Straits. The only species not obtained in these seas or in the Japanese region is the remarkable Crab *Gonatonotus pentagonus* of Adams and White, which was dredged in the Javan sea, near Billiton Island, at a depth of 12 fathoms.

In the present communication 64 species or well-marked varieties belonging to the Podophthalmia are noticed; and of these 26 are apparently new to science, besides which there are several which for different reasons I have refrained from designating by a specific name. The names and the families to which they appertain are given in the systematic list which follows, where also I have noted the localities and the geographical range, when known.

In a second paper I hope to describe the remainder of the species collected, which belong chiefly to the orders Amphipoda and Isopoda, and to the Cirripedia and Pycnogonida, and are not less interesting than the Podophthalmia.

*List of Species described in the present paper.*

PODOPHTHALMIA.

DECAPODA.

BRACHYURA.

OXYRHYNCHA v. MAIOIDEA.

MAIIDEÆ.

*Pugettia quadridens* (De Haan). Corean Channel, Japan, Hong Kong: p. 23.

*P. incisa* (De Haan). Corean Channel, Japan: p. 23.

*Oregonia hirta*, Dana. Japan, California: p. 24.

*Pleistacantha sancti-johannis*, gen. and sp. n. Japanese seas (North Pacific coast): p. 24.

*Achaus spinosus*, n. Corean Channel: p. 25.

*A. tuberculatus*, n. Corean Channel: p. 25.

*Hyastenus diacanthus* (De Haan). Japan, Corean Channel, Australian and Indo-Malayan seas: p. 26.

*H. (Chorilia) japonicus*, n. Japanese seas: p. 27.

*Doclea orientalis*, n. Kunasiri Isl.?, Yeso Island: p. 28.

PARTHENOPIDEÆ.

*Gonatonotus pentagonus*, Ad. & White. Javan Sea, Borneo, North-east Australia: p. 29.

*Lambrus intermedius*, n. Corean Channel: p. 29.

## CYCLOMETOPA v. CANCROIDEA.

## CANCRIDÆ.

*Actea granulata*, Audouin. Japanese seas, Indo-Pacific region : p. 30.

*Actæodes tomentosus* (M.-Edw.), var. Goto Islands, Indo-Pacific region : p. 30.

*Leptodius exaratus* (M.-Edw.), var. Corean Channel, Japanese seas : p. 31.

## ERIPHIIDÆ.

*Pilumnus hirsutus*, Stm. Corean Channel, North-China seas : p. 31.

*P. dehaani*, n. Gulf of Yedo : p. 32.

## PORTUNIDÆ.

*Thalamita sina*, M.-Edw. Japanese seas, Indo-Pacific region : p. 32.

*Goniosoma ornatum*, A. Edw. Seas of Eastern Asia : p. 33.

*G. variegatum* (Fabr.). Indian and East-Asian seas : p. 33.

*Portunus corrugatus* (Pennant). British seas, Mediterranean, Red Sea, Japan : p. 33.

## CORYSTIDÆ.

*Trichocarcinus dentatus*, n. Japan, Corean Channel : p. 34.

*T. affinis*, n. Corean Channel : p. 35.

*Telmessus acutidens* (Stm.). Japanese seas : p. 36.

## CATOMETOPA v. GRAPSOIDEA.

## MACROPHTHALMIDÆ.

*Gelasimus lacteus*, De Haan. Japanese and Corean seas : p. 36.

## GRAPSIDÆ.

*Heterograpsus longitarsis*, n. Japanese and Corean seas : p. 37.

*Platygrapsus depressus* (De Haan), junr. Chinese, Japanese, and Corean seas : p. 37.

*Helice tridens*, De Haan. Seas of Japan and China : p. 38.

*Leiolophus planissimus* (Herbst). Indo-Pacific and Atlantic region : p. 38.

## CARCINOPLACIDÆ.

*Heteroplax? nitidus*, n. Corean Channel : p. 39.

## RHIZOPIDÆ.

*Typhlocarcinus villosus*, Stm. Corean Channel, Hong-Kong : p. 40.

## OXYSTOMATA v. LEUCOSIIDÆ.

## LEUCOSIIDÆ.

*Leucosia hamatosticta*, Ad. & White, var. Corean Channel, Kagosima, "Eastern seas : " p. 40.

*Pseudophilyra tridentata*, gen. and sp. n. Corean Channel : p. 41.

*Philyra*, sp. Matoya : p. 41.

*Myra dubia*, n. Corean Channel : p. 42.

*Ebalia rhomboidalis*, n. Corean Channel : p. 42.

*E. minor*, n. Corean Channel: p. 43.

*E. bituberculata*, n. Japanese seas (North Pacific coast): p. 43

*Cryptocnemus pentagonus*, Stm. Corean Channel, Gulf of Kago  
sima: p. 43.

*Arcania globata*, Stm. Corean Channel, China Sea, "Eastern  
seas:" p. 44.

*A. orientalis*, n. Corean Channel, Japanese seas (North Pacific  
coast): p. 44.

#### ANOMURA.

#### DROMIDEA.

#### DROMIIDÆ.

*Cryptodromia*, sp. Japanese seas (North Pacific coast): p. 44.

#### HOMOLIDÆ?

*Paratymolus vubescens*, gen. and sp. n. Matoya: p. 45.

#### RANINIDEA.

*Ranina serrata*, Lam. Japan, Indo-Pacific region: p. 46.

*Lyreideus tridentatus*, De Haan? Japan, Kada Bay: p. 46.

#### PORCELLANIDEA.

*Porcellana spinulifrons*, n. Corean Channel: p. 46.

*Pachycheles stevensii*, Stm. Japanese and Corean seas: p. 47.

#### LITHODIDEA.

*Hapalogaster dentatus* (De Haan). Japan, Goto Islands: p. 47.

*Cryptolithodes expansus*, n. North Japan: p. 47.

#### PAGURIDEA.

*Eupagurus cavimanus*, n. Japanese seas (Tsugar Straits): p. 48.

*Pomatocheles jeffreysii*, gen. and sp. n. Corean and Japanese seas:  
p. 49.

#### GALATHEIDEA.

*Galathea orientalis*, Stm. Corean Channel, Hong Kong (Ly-i-  
moon Straits): p. 51.

*Munida japonica*, Stm. Corean Channel, Gulf of Kagosima: p. 51.

#### MACRURA.

#### THALASSINIDEA.

#### GEBIIDÆ.

*Gebia major*, De Haan. Japan, Katsura, and Kada Bay: p. 52.

#### CARIDEA.

#### CRANGONIDÆ.

*Paracrangon echinatus*, Dana. Yedo Island, California, Puget  
Sound: p. 52.

## ALPHEIDÆ.

*Alpheus bisincisus*, De Haan. Japan, Katsura, Corean Channel : p. 53.

*A. japonicus*, n. Japanese seas (North Pacific coast) : p. 53.

*A. kingsleyi*, n. Japanese seas (North Pacific coast) : p. 54.

*A. gracilipes*, Stm.? Corean Channel, Tahiti : p. 55.

*Rhynchocyclus planirostris* (De Haan). Japan, Ly-i-moon Straits, near Hong Kong : p. 55.

*Hippolyte leptognatha*, Stm. Japan, Gulf of Yedo, Hakodadi : p. 56.

*Pandulus gracilis*, Stm. Corean Channel, Gulf of Hakodadi : p. 56.

## PENÆIDEA.

## PENÆIDÆ.

*Penæus affinis*, M.-Edw. Japanese and Corean seas, Indo-Pacific region : p. 56.

## CUMACEA.

*Heterocuma sarsi*, gen. and sp. n. Corean and Japanese seas : p. 58.

*H. sarsi*, var. *granulata*, n. Corean Channel : p. 58.

*Remarks on the Geographical Distribution of the Species.*

The Crustacean fauna of Japan includes many species of restricted range and peculiar to the seas of Eastern Asia, besides many of the common and widely-spread littoral Indo-Pacific forms; but it also presents affinities with the European and especially the Mediterranean fauna, and that of the west coast of the American continent. As illustrating the European affinities I may note the occurrence, both in the South-European and Japanese seas, of such well-known genera as *Acheus*, *Ebalia*, and *Eupagurus*, and the remarkable genus *Latreillia* (of this latter I have seen no specimens), and of the *Portunus corrugatus*, Pennant, originally described from the British coast; moreover the *Penæus distinctus*, De Haan, is either identical with or closely allied to the Mediterranean *Solenocera siphonocera*, Philippi, and in the present collection occur species of the genera *Mæra* and *Pycnogonum*, scarcely distinct from the well-known European *M. truncatipes* and *P. littorale*. The last-mentioned is a boreal species; but the instances above given (and others which might be cited) show that the relationship which does exist is not confined to forms which may have made their way from Europe to Japan along the northern shores of Asia.

The affinity of the Japanese with the Western-American Crustacean fauna is similarly evidenced by the existence of many genera common to the shores of both regions, the species being either identical or very closely allied, so closely, indeed, that further comparative study might show the relationship is even more near than is now suspected. Instances in the present collection are the genera *Pugettia*, *Oregonia*, *Trichocarcinus*, *Telmessus*, *Heterograpsus*, *Hapalogaster*, *Pachycheles*, *Paracrangon*, *Rhynchocyclus*, among the Podophthalmia.

Many of the genera thus common to the two regions are scarcely

found elsewhere, and are peculiarly characteristic of the Pacific coasts of America. Some, having a boreal range (*Echidnocerus*, *Hapalogaster*), evidently pass from one continent to the other *via* Behring's Straits; but instances are not wanting (although rare) of forms which have never been shown to have a boreal range occurring on both coasts of the Pacific. An example occurs in the present collection in the curious Shrimp *Paracrangon echinatus*, Dana, in the case of which I have satisfied myself, by actual comparison, of the identity of examples from Puget Sound, California, and Yedo Island. *Hyastenus* (*Chorilia*) *japonicus*, and *Telmessus acutidens*, Stm., may, upon further comparison, prove to be identical with their American congeners.

## BRACHYURA.

### OXYRHYNCHA vel MAIOIDEA.

#### MAIIDÆ.

##### PUGETTIA QUADRIDENS.

*Menæthius quadridens*, De Haan, Faun. Japon. Crust. p. 97, pl. xxiv. fig. 2, ♂ (*Halimus*), and pl. G (1839).

*Pugettia quadridens*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 219 (1857).

This species is very closely allied to the *Pugettia gracilis*, Dana (U.S. Expl. Exp. xiii. p. 117, pl. iv. fig. 3, 1852), from the Californian coast; but the lateral lobes or expansions of the carapace are less broad and triangular in shape, and more acute at the extremity. In the females the carapace is more convex than in the males, with the hepatic regions more convex.

Otarrañai,  $5\frac{1}{2}$  fathoms, lat.  $43^{\circ} 12' N.$ , long.  $141^{\circ} 1' E.$ ; Isenomi Straits, low-water mark; Corean Channel, lat.  $33^{\circ} 12\frac{1}{2}' N.$ , long.  $129^{\circ} 5' E.$ , 9 fathoms. Males, females, and young were collected.

Stimpson's specimens were from Simoda, Japan, and Hong Kong.

##### PUGETTIA INCISA.

*Menæthius incisus*, De Haan, Faun. Japon. Crust. p. 98, pl. xxiv. fig. 3, ♀ (*Halimus*), and pl. G (1839).

*Pugettia incisa*, Stm. Proc. Ac. Nat. Sci. Phil. p. 219 (1857).

Three specimens, males, all of small size, were obtained of this species, which differs from its congeners in the auriculiform shape of the first pair of lateral expansions of the carapace, in which it exhibits some affinity with the genera *Hyas* and *Hyastenus*, from the first of which it differs in the slender divergent horns of the rostrum, and from the second in the far less perfectly defined orbits. Although the basal joint of the antennæ is somewhat broader, the structure of the antennal and orbital regions is essentially that of *Pugettia*.

Gulf of Yedo (bottom soft mud and hard sand); Corean Channel, lat.  $33^{\circ} 10' N.$ ,  $129^{\circ} 12' E.$ , at 36 fathoms.

This and the preceding species were previously unrepresented in the British-Museum collection.

## OREGONIA HIRTA?

? *Oregonia hirta*, Dana, Amer. Journ. Sci. and Arts (ser. 2), xi. p. 270 (1851); U.S. Expl. Exp. xiii., Crust. i. p. 107, pl. iii. fig. 3 (1852).

Two specimens of an *Oregonia* were collected, both females, the larger and mature example densely overgrown with sea-weed. These agree in almost every respect with specimens of *Oregonia hirta*, from California (Puget's Sound), in the collection; but the legs are rather more robust, and the branchial regions more convex. The examination of males might show that they belong to a distinct species; for the present, however, they cannot be regarded as distinct.

Japan, Cape Blunt, lat.  $41^{\circ} 41'$  N., long.  $141^{\circ} 0'$  E. (depth 35 fathoms).

PLEISTACANTHA, gen. nov.<sup>1</sup>

Carapace triangular, convex, and spinose. Rostrum long and slender, composed, as in *Oregonia*, of two spines, which are in contact with one another to near their extremities. Eyes laterally projecting. Orbits not defined, the inferior walls wanting, the superior and posterior represented by two or three spines. Antennules long; interantennular septum with a prominent spine projecting downward. Antennæ with the basal joint extremely slender and armed with three spines; the flagellum long, reaching almost to the extremity of, and visible in a dorsal view at, the side of the rostrum. Ischium (or second) joint of the outer maxillipeds longer than the merus-joint, which has a short spine at its antero-external angle; the exognath very slender. Legs, as in *Egeria*, very long; the anterior pair robust, with the fingers acute and meeting near their apices along their inner margins, but leaving an *hiatus* at base when closed. The ambulatory legs are slender, and diminish successively in length to the last pair; their terminal joints are long, slender, and densely hairy. The male postabdomen is 6-jointed, the inflexed portion oblong, the terminal joint transverse and rounded at its distal extremity.

This genus must be placed near *Oregonia*, with which it is nearly allied in the structure of the rostrum and orbital and antennal region; but it differs in the convex and spinose carapace and greatly elongated legs, which gives it more the aspect of *Egeria*, and would necessitate its being placed among the *Macropodiens* in Milne-Edwards's arrangement. From *Egeria* it differs in the structure of the orbital and antennal region, &c.

## PLEISTACANTHA SANCTI-JOHHANNIS, sp. n. (Plate I. fig. 1.)

Carapace covered with very numerous small spines of uniform size; interspersed with these are longer spines, of which three are placed in a transverse series on the front and one at the back of the gastric region, two on the cardiac, two on the intestinal and about three on each branchial region; there are also several longer spines placed behind the eyes and on the sides of the branchial regions. Rostrum

<sup>1</sup> πλειστος, superl. of πολὺς, many; and ἀκανθα, a spine.

nearly half as long as the carapace, the spines of which it is composed divergent near their extremities, and armed on their undersides with two or three spinules. Anterior legs with the arm and wrist covered with small spines; arm with a strong conical curved spine on the upper margin at its distal extremity; palm robust, about as long as the arm, with fewer spinules arranged in longitudinal series; fingers naked. Ambulatory legs with numerous small spinules; the terminal joints, and in the last pair the two preceding joints are without spines and hairy. Length of carapace to base of rostrum  $\frac{3}{4}$  inch, breadth about  $\frac{7}{12}$  inch; length of anterior leg  $3\frac{1}{8}$  inches.

This species was obtained at a depth of 63 fathoms, in October 1874, in lat.  $34^{\circ} 1' N.$ , long.  $136^{\circ} 20' E.$

A single male individual was collected. As it is certainly one of the most striking novelties in the collection, I have much pleasure in dedicating it to its indefatigable discoverer, Capt. H. C. St. John, R.N.

#### ACHÆUS SPINOSUS, sp. n.

Carapace triangular, narrowed behind the orbits, as in *Achæus* (*Inachus*) *lorina*, and armed with six spines above, viz. one on the gastric, one (which is bilobate) on the cardiac, and two on each branchial region; there are also two or three small spines or tubercles on the sides of the body, beneath the hepatic and branchial regions. The rostrum, as in all the species of the genus, is very small and bilobate. Eye-peduncles robust, laterally projecting and armed with a strong tubercle in front. Anterior legs (in the male) robust; arm and wrist with a few scattered granules above; palm swollen, with about six spinules on the upper margin and a few small granules on the lower margin, near its base; fingers acute, with a wide hiatus at base when closed, both the fingers with a strong tooth on their inner margins near the base; both are faintly cristated on their outer margins. Ambulatory legs very slender, the terminal joint of the last pair strongly falcated. Terminal postabdominal segment subtriangular. Length  $\frac{1}{3}$  inch, breadth  $\frac{1}{4}$  inch.

A single specimen (male) was collected at a depth of 30 fathoms, in lat.  $34^{\circ} 10' N.$ , long.  $136^{\circ} 47' E.$

The nearest ally of this species seems to be the *Achæus lorina* (*Inachus lorina*, Ad. & White, Zool. Samarang, Crust. p. 3, pl. ii. fig. 2, 1848), from Mindanao, from which it differs in the number and disposition of the spines of the carapace. Both of these species externally resemble *Inachus*, but differ in the absence of defined orbits and in the falcated posterior legs, on account of which they must be referred to *Achæus*.

#### ACHÆUS TUBERCULATUS, sp. n.

There are several specimens of a species of *Achæus* in the collection, which are all unfortunately in an imperfect condition, the anterior and most of the ambulatory legs being absent. The carapace is triangular and broader than in the preceding species, without spines, not constricted behind the interocular region; the regions are con-

vex and well defined ; and there is a very prominent conical tubercle upon the cardiac region which is not bilobate, also a broad lobe or tubercle upon the hepatic region. The eye-peduncles are smooth ; the posterior legs have the last joint but slightly falcated. The postabdomen of the male is broader than in the preceding species, the terminal segment transverse. Length (of male) nearly  $\frac{5}{12}$  inch, breadth nearly  $\frac{1}{3}$  inch.

Specimens were collected at a depth of 36 fms., in lat.  $33^{\circ} 10' N.$ , long.  $129^{\circ} 12' E.$  ; and there are others without definite locality attached.

This species resembles the *Achaus lacertosus* of Stimpson (Proc. Ac. Nat. Sci. Phil. p. 218, 1857), from Australia, Port Jackson, in the distinctly defined regions of the carapace, the presence of an hepatic lobe, and the smooth eye-peduncles, but differs in the very prominent tubercle or blunt spine on the cardiac region, which is present in both sexes, whereas Stimpson, in his description of *Achaus lacertosus*, says, "*superficie laevi spinis carente.*" I must therefore regard it as distinct. Stimpson's species was from Port Jackson, Australia.

*Achaus japonicus*, De Haan (Faun. Jap. Crust. p. 99, pl. xxix. fig. 3, 1839), is described and figured as devoid of spines on the carapace, and the eye-peduncles as being 4-spinulose ; there is no hepatic lobe.

#### HYASTENUS DIACANTHUS.

*Naxia diacantha*, De Haan, Faun. Japon. Crust. p. 96, pl. xxxiv. fig. 1, and pl. G (1839).

*Hyastenus diacanthus*, A. M.-Edw. Nouv. Archiv. Mus. Hist. Nat. viii. p. 250 (1872).

*Hyastenus verreauxii*, A. M.-Edw. *l. c.* p. 250 (1872).

A single male specimen of this common inhabitant of the Japanese seas was obtained at Ousima, Japan, in 9 fathoms of water on a sandy bottom.

Two other specimens of this genus are in the collection ; the first, a small female specimen, was collected in lat.  $33^{\circ} 4' N.$ , long.  $129^{\circ} 18' E.$ , at a depth of 23 fathoms. All the limbs are unfortunately missing. It differs in the much greater divergence of the horns of the rostrum, and very probably belongs to a distinct species ; but, on account of its mutilated state, I refrain from describing it as such.

In the second, the horns of the rostrum are more than half the length of the carapace and but slightly divergent ; the carapace is convex, narrower and more elongated than in *Hyastenus diacanthus*, and without any spines or tubercles, and is covered with a very short close pubescence.

This specimen is also an immature female, and was obtained at a depth of 18 fathoms, near Cape Sima. It would not be advisable to make this the type of a new species by giving it a distinct appellation ; but it is distinguished from its nearest ally, *H. diacanthus*, by the total absence of the lateral epibranchial spines, which are present, although very small, in examples of *H. diacanthus* of the same size.



## HYASTENUS (CHORILIA) JAPONICUS, n. sp. (Plate I. fig. 2.)

Carapace triangular, rounded behind, with the regions separated by well-marked depressions, and covered with small distant tubercles; of these there are about eight on the gastric and each branchial region, one or two on the hepatic and genital, and one larger on the intestinal region; the cardiac region is very convex. There is a spine on the side of each branchial region. The horns of the rostrum are straight, not half as long as the carapace, and more divergent than in *C. longipes*. On the pterygostomian regions, and on the sides of the carapace, there is a series of small tubercles. The anterior legs (in the adult male) are robust, the arm granulated and ridged on its under, inner, and outer sides, granulated above, and with two spines near its proximal extremity on its upper and two or three on its under surface; wrist granulated and ridged on its upper and outer surface; palm smooth, compressed, acutely carinated above; fingers smooth, denticulated on their inner margins near their apices, the upper with a strong tooth near its base; when closed, they have a wide hiatus at base. The ambulatory legs are slender, smooth, diminishing successively in length from the first to the last; the terminal joints almost immobile and bent at right angles to the preceding. Length of carapace of an adult male about 1 inch to base of rostrum; greatest breadth about  $\frac{5}{8}$  inch.

A good series, including males, females, and young, were collected at a depth of 100 fathoms, in lat.  $41^{\circ} 40' N.$ , long.  $141^{\circ} 10' E.$

The description was taken from an adult male. In the females and younger animals several differences are remarked; notably, the anterior legs are much slenderer, legs granulated and ridged, the fingers nearly straight, without a hiatus and strong tooth at base.

The nearest ally of this species is unquestionably the *C. longipes* of Dana (U.S. Expl. Exp. Crust. i. p. 91, pl. i. fig. 5), from the coast of Oregon. The arrangement of the tubercles is nearly the same; but the one now described differs in its shorter, more divergent rostral spines, the shorter spines upon the basal joint of the antennæ, and in the arms never being spinulose along the whole of their upper surface, &c., and must be regarded, at least provisionally, as distinct. There is very little hair on the front and sides of the carapace and rostrum; and the hands are nearly naked.

*Chorilia* scarcely differs generically from *Hyastenus*, the structure of the orbits and antennal region and the characteristic length of the first pair of ambulatory legs being the same in both. It may be convenient, however, to retain the name as a subgeneric division including those species of *Hyastenus* in which the carapace is *tuberculated and uneven above*—e. g., the present species, *Chorilia longipes*, and the *Hyastenus oryx* and *verrucosipes* of White.

## DOCLEA.

The genera *Libinia*, *Libidoclea* and *Doclea* constitute, in Dana's arrangement, a natural group; characterized by their *very convex and orbiculate or shortly pyriform and tuberculated or spinose carapace*

and *emarginate rostrum*. It is extremely difficult to find reliable characters by which to define the genera, as the species pass into one another by almost insensible gradations. At one end of the series are those which belong undoubtedly to the genus *Libinia*, in which the carapace is triangulate rather than orbiculate, with a distinct supraocular tooth, the rostrum prominent, with the spines coalescent and divergent only toward the apex, which thus appears notched, the orbits circular and well defined, with usually a single closed fissure above, the basal joint of the antennæ moderately dilated, and the legs usually of moderate length, the first pair rather slender in the male. At the opposite extremity of the series are the species of *Doclea* in which the carapace is orbiculate in outline, the rostrum very short, the supraocular spine absent, the basal joint of the antennæ narrower, the orbits scarcely defined at all below, the legs usually very long, those of the first pair in the male short, with the palm dilated. The genus *Libidoclea* of Milne-Edwards and Lucas is somewhat intermediate between the two former, having the triangulate carapace, prominent rostrum, dilated basal antennal joint of *Libinia*, with the incomplete orbits and long legs of *Doclea*; the typical species, *L. granaria* (Edw. & Luc. in D'Orbigny's Voy. Amér. Mérid. vi. Crust. p. 8, pl. iii. fig. 1 & pl. iv. fig. 1, 1845), from Valparaíso, possesses an additional character in the existence of a notch on the anterior margin of the third joint of the outer maxillipeds; and the tooth in the middle of the outer margin of the basal joint of the antennæ is very strong; the former of these fails, however, in the *Libidoclea coccinea* of Dana (U.S. Expl. Exp. xiii. Crust. p. 88, pl. i. fig. 3), from Patagonia, which also has a shorter rostrum. In certain species of *Libinia* (*L. emarginata*) there is a small blunt tooth on the outer margin of the basal antennal joint. There appears, then, to be no alternative between restricting the genus *Libidoclea*, by adopting the single character of the emarginate third joint of the outer maxillipeds, or extending its definition until it shall include all the species intermediate between the two older genera. The former is perhaps the preferable course, as, if the latter were adopted, it would be impossible to assign any definite characters to the genus.

#### DOCLEA ORIENTALIS, sp. n. (Plate II. fig. 1.)

The carapace is convex and subpyriform, with six tubercles in the middle line, of which the first three are on the gastric, two (one more elevated) on the cardiac, and one on the intestinal region; none of these are large and spiniform. There are two prominent tubercles on the lateral anterior margins, one of them placed at some distance behind the orbits, and one on the sides of the branchial region. There are four small tubercles on the front of the gastric region, forming, with the first of the median series, a figure  $\cdot \cdot \cdot$ , seven or eight on the branchial region, on each side, and three on the pterygostomian region. The rostrum is short, but little longer than broad, and notched to its middle. The orbits have a supraocular tooth, a wide hiatus above, and two fissures below. The basal joint of the antennæ is rather

broad, with an obscure tooth on its outer margin. Anterior legs in the female small; hands compressed, and fingers straight; the ambulatory legs short, those of the first pair not much exceeding in length the greatest breadth of the carapace. Length of carapace and rostrum 1 inch  $2\frac{1}{2}$  lines, breadth  $11\frac{1}{2}$  lines.

Two specimens, females, were obtained, one at Kunashir (Kunasiri Island?), N. Japan, at a depth of 11 fathoms, bottom small stones; the other from the N.E. coast of Yeso Island.

The nearest ally of this species seems to be the *Doclea gracilipes* of Stimpson (P. Ac. Nat. Sci. Phil. p. 216, 1857), from Hong-Kong, from which it differs in the tuberculation of the carapace and very short anterior legs.

Streets, in a notice of the genus *Libinia* (P. Ac. Nat. Sci. Phil. p. 106, 1870), has described a new species, *L. rhomboidea*, from the East Indies, which may easily be distinguished from the present by the existence of strong spines on the branchial regions and lateral margins.

Another Asiatic species is the *Libinia bidentata*, A. M.-Edw. (Journ. Mus. Godeffroy, i. pt. 4, p. 77, 1873), from the Amoor, which has fewer spines upon the surface of the body. Several *Docleæ* have also been described by Bleeker (Acta Soc. Sci. Indo-Neerl. ii. pp. 7-15, 1857), from the Indian archipelago; but none have any near affinity with *Libinia orientalis*.

#### PARTHENOPIDÆ.

##### GONATONOTUS PENTAGONUS.

*Gonatonotus pentagonus*, Ad. & White, P. Z. S. 1847, p. 58; Zool. Samarang, Crust. p. 33, pl. vi. fig. 7 (1848).

Javan Sea, near Billiton Island, lat.  $3^{\circ} 21' S.$ , long.  $108^{\circ} 39' E.$  Dredged at a depth of 12 fathoms.

The single specimen collected is a male, and differs from the female from Borneo, figured by Adams and White, only in the greater length and strength of the anterior legs; the postabdomen is seven-jointed and narrow. There are two young specimens of this species, from reefs on the N.E. coast of Australia, in the British-Museum collection.

This is the only species of Crustacean collected elsewhere than in the Japanese and Corean seas.

##### LAMBRUS INTERMEDIUS, sp. n.

Carapace triangular, almost destitute of tubercles above, and without large spines on the margins; on the upper surface are three elevated ridges, one on the gastric and cardiac, and one on each branchial region; the median ridge is marked with about four obscure tubercles; the branchial ridges are obscurely granulated; and on the sides of the branchial regions are seven to eight small triangular marginal teeth, which under a lens are seen to be denticulated; the last of these is the largest; on the posterior margin are seven small distant tubercles. There is an elongate depression between the eyes. The rostrum is triangular, smooth and acute; the anterior legs are of moderate length

(for a species of this genus); the arm with a longitudinal line of granules on its anterior and posterior margins and on its upper surface; the wrist nearly smooth; the hand trigonous, smooth on its three faces, with a line of small tubercles or granules on its outer and inner margins; of these about four on the outer margin are somewhat larger and equidistant; all the tubercles of the anterior legs are seen under a lens to be themselves granulated; the mobile finger has three or four spines on its upper margin; the ambulatory legs are very small and compressed; the margins of the merus-joints of the last two pairs are granulated. Length about  $\frac{1}{3}$  inch, greatest breadth about  $\frac{7}{12}$  inch.

Corean seas (no exact particulars regarding the locality). One male individual collected.

This species belongs to the same group as the *L. lamellifrons*, Ad. & Wh., *L. gracilis*, Dana, and *L. affinis*, A. M.-Edw. From the latter (of which there is a large series from the Javan and Indian seas in the British-Museum collection) it differs in the much fewer tubercles of the carapace and arms, which are less rounded, and from the two former in the much greater breadth of the carapace behind the orbits, and the absence of spines on the outer margin of the hands, &c.

#### CYCLOMETOPA vel CANCROIDEA.

##### CANCRIDÆ.

##### ACTÆA GRANULATA.

*Cancer granulatus*, Audouin, Explic. Planches, p. 87, de Savigny, Egypte, Atlas, Crust. pl. vi. fig. 2 (1809).

*Cancer savignyi*, M.-Edw. Hist. Nat. Crust. i. p. 378 (1834).

*Actæa granulata*, De Haan, Faun. Japon. Crust. p. 18 (1835); A. M.-Edw. Nouv. Archiv. Mus. Hist. Nat. i. p. 275 (1865).

? *Actæa pura*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 32 (1858).

A small male example is in the collection without definite locality attached. This species appears to be common in the Indo-Malayan, Australian, and Japanese seas; and its range extends to the Red Sea, Mozambique, and the Mauritius.

##### ACTÆODES TOMETOSUS, var.

*Zoëmus tomentosus*, M.-Edw. Hist. Nat. Crust. i. p. 385 (1834).

*Actæodes tomentosus*, Dana, Crust. U.S. Expl. Exp. xiii. (i.) p. 197 (1852).

*Actæa tomentosa*, A. M.-Edw. N. A. Mus. II. N. i. p. 262 (1865).

In this variety the carapace is very broad in proportion to its length, the granules with which it is covered small and very numerous, the anterior arcelets scarcely, and the posterior (*e. g.* the cardiac) not at all, distinguishable; the colour is dull red. Length rather more than  $\frac{1}{3}$  inch, breadth  $\frac{7}{12}$  inch.

Collected at the Goto Islands, at low-water mark.

The two males and female collected, on account of the indistinguishability of the arcelets, present a very different appearance both

from the typical *A. tomentosus* and the species or variety designated *A. affinis* by Dana (U.S. Expl. Exp. xiii. Crust. i. p. 198, pl. xi. fig. 3), from the Paumotu or Society Islands; yet I find no characters which would justify me in considering them a distinct species.

*LEPTODIUS EXARATUS*, var.

*Chlorodius exaratus*, A. M.-Edw. Hist. Nat. Crust. i. p. 402 (1834).

*Xantho affinis*, De Haan, Faun. Japon., Crust. p. 48, pl. xiii. fig. 8 (1835).

Two very small specimens of a *Leptodius*, without particulars regarding locality, appear to belong to a well-marked variety of the common *L. exaratus*, or even to a distinct species. As the specimens are immature, it is not advisable to give them a distinct specific name. The carapace is depressed, the areolets scarcely marked and somewhat eroded towards the front and antero-lateral margins; the three posterior antero-lateral marginal teeth are small and subacute, the others obsolete; the frontal lobes are broad, with the anterior margin straight, and they are separated by a very small median notch. The anterior legs have the wrist and hand very rugose on their upper and outer surfaces; the ambulatory legs somewhat dilated and compressed, and the tarsal joints very narrow. Length 3 lines, breadth  $4\frac{1}{2}$  lines.

ERIPHIIDÆ.

*PILUMNUS HIRSUTUS*.

*Pilumnus hirsutus*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 37 (1858).

The large series collected agree in all respects with Stimpson's diagnosis. The outer orbital spine is smaller than the three spines of the antero-lateral margin, which are acute. The larger hand (which is usually the right, but in some individuals the left) is granulated on its upper, and in younger specimens more minutely on its outer, surface; the lower finger is usually in a straight line with the lower margin of the hand. The smaller hand is granulispinulous on its upper and outer surface. In one or two specimens the granules are fewer and more acute, and the lower finger forms a slight angle with the inferior margin of the hand.

This is evidently a very common and abundant species in the Corean seas. Specimens were collected at seven different localities in or near the Corean Straits, at depths varying from 12-40 fathoms. It was, however, previously unrepresented in the British-Museum collection.

I should have regarded this species as being synonymous with the *Pilumnus minutus* of De Haan (Faun. Jap., Crust. p. 50, pl. iii. fig. 2), which is very shortly characterized, were it not that the antero-lateral margins are described and figured as "4-dentatis" (not spinose), and the orbits as "inermibus" by De Haan.

(for a species of this genus); the arm with a longitudinal line of granules on its anterior and posterior margins and on its upper surface; the wrist nearly smooth; the hand trigonous, smooth on its three faces, with a line of small tubercles or granules on its outer and inner margins; of these about four on the outer margin are somewhat larger and equidistant; all the tubercles of the anterior legs are seen under a lens to be themselves granulated; the mobile finger has three or four spines on its upper margin; the ambulatory legs are very small and compressed; the margins of the merus-joints of the last two pairs are granulated. Length about  $\frac{1}{2}$  inch, greatest breadth about  $\frac{7}{12}$  inch.

Corean seas (no exact particulars regarding the locality). One male individual collected.

This species belongs to the same group as the *L. lamellifrons*, Ad. & Wh., *L. gracilis*, Dana, and *L. affinis*, A. M.-Edw. From the latter (of which there is a large series from the Javan and Indian seas in the British-Museum collection) it differs in the much fewer tubercles of the carapace and arms, which are less rounded, and from the two former in the much greater breadth of the carapace behind the orbits, and the absence of spines on the outer margin of the hands, &c.

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In this variety the carapace is very broad in proportion to its length, the granules with which it is covered small and very numerous, the anterior areolets scarcely, and the posterior (*e. g.* the cardiac) not at all, distinguishable; the colour is dull red. Length rather more than  $\frac{1}{2}$  inch, breadth  $\frac{7}{12}$  inch.

Collected at the Goto Islands, at low-water mark.

The two males and female collected, on account of the indistinguishability of the areolets, present a very different appearance both

from the typical *A. tomentosus* and the species or variety designated *A. affinis* by Dana (U.S. Expl. Exp. xiii. Crust. i. p. 198, pl. xi. fig. 3), from the Paumotu or Society Islands; yet I find no characters which would justify me in considering them a distinct species.

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ERIPHIIDÆ.

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The large series collected agree in all respects with Stimpson's diagnosis. The outer orbital spine is smaller than the three spines of the antero-lateral margin, which are acute. The larger hand (which is usually the right, but in some individuals the left) is granulated on its upper, and in younger specimens more minutely on its outer, surface; the lower finger is usually in a straight line with the lower margin of the hand. The smaller hand is granulispinulose on its upper and outer surface. In one or two specimens the granules are fewer and more acute, and the lower finger forms a slight angle with the inferior margin of the hand.

This is evidently a very common and abundant species in the Corean seas. Specimens were collected at seven different localities in or near the Corean Straits, at depths varying from 12-40 fathoms. It was, however, previously unrepresented in the British-Museum collection.

I should have regarded this species as being synonymous with the *Pilumnus minutus* of De Haan (Faun. Jap., Crust. p. 50, pl. iii. fig. 2), which is very shortly characterized, were it not that the antero-lateral margins are described and figured as "4-dentatis" (not spinose), and the orbits as "inermibus" by De Haan.

Stimpson's specimens of *P. hirsutus* were collected in the North-China sea and near Ousima Island.

*PILUMNUS DEHAANII*, sp. n.

The carapace is broader than long, convex, and everywhere covered with a close velvety pubescence, so that no traces of the regions are visible. Antero-lateral margins shorter than the postero-lateral, and armed with three small spines (excluding that of the outer orbital margin, which is not at all prominent). The orbital margins and the front (seen in a dorsal view) are minutely denticulated. In an anterior view the frontal margin is sinuated, with a median notch. The anterior legs are short, robust, the right slightly the larger; the arm trigonous and very short; the wrist with a few conical acute granules on its anterior and upper surface; the palm smooth on its inner, and armed on its upper and all its outer surface with numerous, crowded, unequal, conical, acute tubercles; fingers acute, meeting when closed, the upper granulous at base. The ambulatory legs are slightly compressed and hairy. Length  $3\frac{1}{2}$  lines, breadth  $4\frac{1}{2}$  lines.

The single specimen, a female, was found within the shell of a species of *Balanus* collected in the Gulf of Yedo.

This species, on account of the closely pubescent carapace and form of the hands, has more of the aspect of an *Actumnus* than of *Pilumnus*, but differs in the acute fingers and spiniform antero-lateral teeth from that genus.

I cannot refer it to any of the numerous published descriptions. It is readily distinguished by the nearly equal and closely tuberculated hands, the tubercles extending halfway along the mobile finger and covering the outer surface of the hand to the apex of the immobile finger. The fingers are nearly colourless. From the *P. actumnoides* of M. A. Milne-Edwards from New Caledonia (Nouv. Arch. Mus. H. N. ix. p. 247, pl. x. fig. 3, 1873), to which it bears some resemblance, it is at once distinguished by the fewer lateral marginal teeth, &c.

It has also some affinity with the *Pilumnus setiger* and *P. squamosus* of De Haan, which have been referred by M. A. Milne-Edwards, rightly I believe, to *Actumnus*. From the former it differs in the regions of the carapace being obliterated, and from the latter in the conical (not squamiform) tubercles of the hands, which are not seriatly disposed; from both, probably, in the spiniform marginal teeth.

PORTUNIDÆ.

*THALAMITA SIMA*.

*Thalamita sima*, Milne-Edw. Hist. Nat. Crust. i. p. 460 (1834); Stimpson, Proc. Ac. Nat. Sci. Phil. p. 39 (1858); A. M.-Edw. Arch. Mus. Hist. Nat. x. p. 359 (1861).

*Portunus (Thalamita) arcuatus*, De Haan, Faun. Japon., Crust. pp. 10, 43, pl. ii. fig. 2, pl. xiii. fig. 1 (1835).

A female example was collected of this species, which seems to



be commonly distributed along the Asiatic coasts from the Red Sea to Japan, and is also found on the coasts of Australia and New Zealand.

Uku Sima ; lat.  $33^{\circ} 15\frac{1}{2}'$  N., long.  $129^{\circ} 5'$  E.

#### GONIOSOMA ORNATUM.

*Portunus (Thalamita) truncatus*, De Haan, Faun. Japon., Crust. pp. 10, 43, pl. ii. fig. 3, & pl. xii. fig. 3 (1835), nec Fabr.

*Goniosoma ornatum*, A. M.-Edw. Arch. Mus. Hist. Nat. x. p. 376 (1861).

Two specimens (males) were collected—one in Ousima Harbour at 8 fathoms, on a bottom of sandy mud and broken shells, the other in lat.  $34^{\circ} 6'$  N., long.  $136^{\circ} 15'$  E., at a depth of 11 fathoms.

This species has not, so far as I know, been recorded elsewhere than in the seas of Eastern Asia. Specimens are in the British Museum from the Philippines.

#### GONIOSOMA VARIEGATUM.

*Portunus variegatus*, Fabr. Ent. Syst. Suppl. p. 364 (1798).

*Cancer callianassa*, Herbst, Naturg. Krabben, iii. (2) p. 45, pl. liv. fig. 7 (1801).

*Thalamita callianassa*, M.-Edw. Hist. Nat. Crust. i. p. 464 (1834).

*Charybdis variegatus*, De Haan, Faun. Japon., Crust. pp. 10, 42, pl. i. fig. 2 (1835); Stimpson, Proc. Ac. Nat. Sci. Phil. p. 39 (1858).

*Goniosoma callianassa*, A. M.-Edw. Arch. Mus. Hist. Nat. x. p. 382 (1861).

A single specimen, in which all the legs (except the fifth natatory legs) are wanting, and without definite locality, is in the collection.

It seems evident that the name of *variegatum* should be retained for this species, as Milne-Edwards, who was the first to apply to it Herbst's later name of *callianassa*, considers the *variegatum* as only a marked variety of the same species. There is a specimen from Hong-Kong in the British-Museum collection.

#### PORTUNUS CORRUGATUS.

*Cancer corrugatus*, Pennant, Brit. Zool. iv. p. 5, pl. v. fig. 9 (1877).

*Portunus corrugatus*, Leach, Ed. Encycl. vii. p. 390 (1814), Linn. Trans. xi. p. 315 (1815); Mal. Pod. Brit. pl. vii. figs. 1, 2 (1825); M.-Edw. Hist. Nat. Crust. i. p. 443 (1834); De Haan, Faun. Japon., Crust. p. 40 (1835); Bell, Brit. Crust. p. 94 (1853); A. M.-Edw. Arch. Mus. Hist. Nat. x. p. 401, pl. xxxvi. fig. 3 (1861); Heller, Crust. südl. Europa, p. 86 (1863).

*Portunus strigilis*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 38 (1858); A. M.-Edw. Arch. Mus. Hist. Nat. x. p. 402 (1861).

Three specimens, of small size (two males and a female), of *Portunus* are in the collection, which agree in every respect with ex-

amples of the common *P. corrugatus* of the European seas. The strigose and hairy carapace, and the form of the frontal lobes, of the teeth of the antero-lateral margins, of the anterior and ambulatory legs, of the male postabdomen, and intromittent organs, are identical in the Japanese specimens and examples of the same size from the Mediterranean. It cannot be doubted that this is also the species described by Stimpson under the name of *P. strigilis*, and of which M. Alphonse Milne-Edwards, when he published his monograph of the *Portunidae*, had not seen examples.

Goto Island Ojica, at low-water mark; same locality, lat.  $33^{\circ} 12\frac{1}{2}'$  N., long.  $129^{\circ} 5'$  E., at 9 fathoms; also at lat.  $32^{\circ} 49'$  N., long.  $128^{\circ} 54'$  E., at 11 fathoms.

I am inclined to regard the species described as *P. subcorrugatus* by A. Milne-Edwards (A. Mus. H. N. x. p. 402, pl. xxxvi. fig. 2), from the Red Sea, as a mere variety of this species, from which it differs only in the obscure trilobation of the front. There is an example from Naples in the British-Museum collection. Its distribution, therefore, so far coincides with that of the typical *P. corrugatus* that it is found both in the European and Oriental regions—that is, on either side of the Isthmus of Suez.

#### CORYSTIDÆ.

##### TRICHOCARCINUS.

*Trichocera*, De Haan, Faun. Japon., Crust. p. 16 (1833).

The genus *Trichocera*, founded by De Haan, appears to be scarcely generically distinct from *Cancer*, its chief characteristics (and those wherein it exhibits a degradation from the Canceroid type) consisting in its narrower, more convex carapace and longer antennules, on which account it has been placed by Dana and other authors in the *Corystidæ*. It is necessary, if it be retained, to alter its designation, as the name *Trichocera* had been previously employed (in 1803) for a genus of Dipterous insects.

I have therefore slightly modified the termination of De Haan's name, and propose *Trichocarcinus* for the few species of this group, which includes, besides the two now described, only the *Trichocarcinus gibbosulus* (De Haan) and *Trichocarcinus oregonensis* (Dana).

##### TRICHOCARCINUS DENTATUS, sp. n.

Carapace smooth, minutely granulated, with the gastric, cardiac, and the middle of the branchial regions convex; there are two somewhat higher elevations on the gastric and each branchial region. Front five-toothed, the middle one very small, the two outer separated from the rest by a wide interval. Antero-lateral margins with nine, flat, subequal teeth, which are in contact with one another at their bases and broadly triangulate at their apices, and with their margins granulated; behind the ninth tooth is usually a small tooth on the postero-lateral margin, which is defined by a line of granules. The anterior legs are rather robust; there are three spines on the wrist, on the inner and outer surface, and upper mar-

gin near the distal extremity. Hand with usually two spines on its upper margin, and three longitudinal raised lines on its outer surface.

Length of largest male  $10\frac{1}{2}$  lines, breadth 1 inch; of largest female, length 1 inch 1 line, breadth  $1\frac{1}{2}$  inch.

Specimens were collected off the Corean coast, in lat.  $34^{\circ} 30' N.$ , long.  $125^{\circ} 20' E.$ , at 37 fathoms; in lat.  $33^{\circ} 10' N.$ , long.  $129^{\circ} 12' E.$ , in 36 fathoms; in lat.  $33^{\circ} 2\frac{1}{3}' N.$ , long.  $128^{\circ} 48\frac{1}{2}' E.$ , at 22 fathoms; and at Otarranai, lat.  $43^{\circ} 12' N.$ , long.  $141^{\circ} 1' E.$ , at  $5\frac{1}{2}$  fathoms, on a bottom of coarse sand.

In the females the gastric and branchial regions are very much more convex than in the males.

There is considerable variation in the sculpture of the wrist and hands. In some specimens the wrist is roughly ridged on its outer surface; in others it is nearly smooth. The spine on the middle of the upper margin of the hand is sometimes obsolete.

This species differs both from the *T. gibbosulus*, De Haan, from Japan, and the *T. oregonensis*, Dana, from Puget Sound, in the much broader subequal teeth of the antero-lateral margin, in which it has more resemblance to some species of *Cancer*, e. g. *C. edwardsii*, Bell; but it cannot be confounded with that or any other of the genus known to me.

#### TRICHOCARCINUS AFFINIS, sp. n.

Carapace everywhere granulated and sparsely pubescent, with the middle of the gastric and of the cardiac region convex, and a tubercular prominence on each side of the gastric, one smaller on the hepatic, and three on each branchial region. Front three-toothed. Antero-lateral margins with nine, alternately larger and smaller, acute triangular teeth (including the outer orbital tooth); the margins of these teeth are seen under a lens to be minutely denticulated; there is a smaller tooth on the postero-lateral margin behind the last tooth of the antero-lateral margins. Wrist and hand with three series of spinules on the outer surface; wrist with a strong spine, and hand with two spinules on its upper margin. Ambulatory legs pubescent. Length of female  $7\frac{1}{2}$  inch, breadth rather more than  $\frac{1}{2}$  inch.

A male was collected at a depth of 50 fathoms, in lat.  $33^{\circ} 19' N.$ , long.  $129^{\circ} 7\frac{1}{2}' E.$ ; and there is a female individual without definite locality also in the collection.

The species is allied to *T. gibbosulus*, De Haan (Faun. Japon., Crust. p. 45, pl. ii. fig. 4, and pl. xiii. fig. 3), which it resembles in the unequal teeth of the antero-lateral margins; but it differs in the much stronger tuberculation of the carapace, and in having only two spines on the upper margin of the hand.

A larger series might show it to be the young of *T. gibbosulus*; but the two specimens before me differ very much from De Haan's figure of that species.

## TELMESSUS.

*Telmessus*, White, Ann. & Mag. Nat. Hist. (ser. 1) xvii. p. 497 (1846).

*Platycorystes*, Brandt, Bull. Phys. Math. Acad. Pétersb. vii. p. 179 (1849).

*Cheiragonus*, Stimpson, Boston Journ. Nat. Hist. vi. p. 465 (1857).

The term *Cheiragonus* appears to have been adopted for this genus on insufficient grounds; it is referred to by Latreille, without description, simply as follows:—"g. *Cheiragone* (Mém. de l'Acad. de St. Pétersb. 1812)," (see Fam. Nat. Règne Anim. p. 270, 1825). On referring to Tilesius' specific description in (Mém. Acad. Pétersb. v. p. 347, pl. vii. fig. 1, 1815), we find it headed *Cheiragonus*, the description commencing with the words *Cancer cheiragonus*. It seems evident to me that Tilesius intended the term *Cheiragonus* as a specific name for the Kamtchatkan species, which must be designated *Telmessus cheiragonus*, as White's generic name *Telmessus* comes next in priority and is accompanied by a description.

## TELMESSUS ACUTIDENS.

*Cheirogonus acutidens*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 40 (1858).

Japan, Kunashir, lat.  $43^{\circ} 34' N.$ , long.  $145^{\circ} 20' E.$ , at 11 fathoms, on a bottom of small stones, three specimens, and N.E. of Yedo Island, in lat.  $44^{\circ} 27' N.$ , long.  $14^{\circ} 22' E.$ , one specimen.

This species is separated from the *Telmessus serratus* of the western American coast by a very slight character, the somewhat longer and slenderer teeth of the lateral margins, particularly the third tooth; yet the distinction is constant as far as the series before me serves to prove. Two of the specimens are prettily speckled with brownish red, the spots being visible beneath the close pubescence of the carapace. The carapace of the largest of the four specimens only measures  $\frac{3}{4}$  inch in length; and the form of the teeth might undergo some modification as the animal increases in size.

It was previously unrepresented in the British-Museum collection.

Tilesius' species, *Telmessus cheiragonus* from Kamtchatka, is described and figured as having much longer and slenderer marginal spines than even *T. acutidens*; and in the absence of specimens for comparison, I cannot unite the two species.

## CATOMETOPA vel GRAPSOIDEA.

## MACROPHTHALMIDÆ.

## GELASIMUS LACTEUS.

*Ocypode (Gelasimus) lactea*, De Haan, Faun. Japon., Crust. pp. 26, 54, pl. xv. fig. 5 (1835); M.-Edw.?, Ann. Sci. Nat. (sér. 3), Zool. xviii. p. 150, pl. iv. fig. 16 (1852).

Four specimens (males) are in the collection, without any particulars regarding the locality at which they were collected.

This species is distinguished by the form of the front, which at base is about one fourth the width of the carapace, with the sides slightly converging to the distal extremity, the margin of which is nearly straight. The oblique ridge on the inner surface of the larger hand is distinctly granulated; the fingers are not sulcated externally; and their inner margins are simply granulated without teeth or lobes in the adult. In younger individuals there is a very small tubercle or granule in the middle of the inferior margins. It is probable that the species figured by Milne-Edwards under the name of *G. lacteus* (*l. c.*) is to be referred to a distinct species, as the lower finger has a distinct subterminal tooth. This species has been hitherto unrepresented in the national collection, as the specimen purchased by the Trustees as from the Leyden Museum under this name, and referred to by White (*List Crust. Brit. Mus.* p. 36, 1847), belongs to Milne-Edwards's first section of the genus, and is identical with the *G. forcipatus* of Adams and White.

#### GRAPSIDÆ.

##### HETEROGRAPSUS LONGITARSIS, sp. n. (Plate II. fig. 3.)

Carapace nearly as long as broad, quadrate, the surface somewhat uneven and sparsely hairy; the frontal margin straight, without a median sinus; the postfrontal lobes distinctly marked, the lateral margins straight, not arcuated anteriorly as in most species of the genus, and with three prominent acute teeth. The outer maxillipeds have the third joint not dilated at its antero-external angle, and the exognath narrow as in other species of the genus. The anterior legs are clothed with short pubescence, not robust; wrist with a small spine on its inner margin; hand with a longitudinal raised line on its outer surface, and with a patch of hair on its inner surface in the males; fingers straight. Ambulatory legs slender, compressed, with short close hair disposed in longitudinal series; the tarsal joints of all the legs long and slender. Postabdomen of male nearly as in *H. penicillatus*. Length and breadth about  $\frac{1}{2}$  inch.

Otarranai, lat.  $43^{\circ} 12' N.$ , long.  $141^{\circ} 1' E.$ , at  $5\frac{1}{2}$  fathoms, bottom coarse sand (three males and a female); Yokoska Dock, in Gulf of Yedo, one young individual taken from the ship's bottom; and in lat.  $33^{\circ} 12\frac{1}{2}' N.$ , long.  $129^{\circ} 5' E.$ , at 9 fathoms, one young male.

This species is at once distinguished from the Japanese *H. sanguineus* and *H. penicillatus*, De Haan, and most species of the genus, by the narrower hairy carapace with straight sides, and the slender elongated tarsal joints of the fifth ambulatory legs; in these characters it approaches the genus *Cyrtograpsus*, in which genus, however, the outer maxillipeds leave a wider hiatus when closed, and the lateral margins of the carapace are 4-dentated.

##### PLATYGRAPSUS DEPRESSUS, junior?

*Platynotus depressus*, De Haan, Faun. Japon., Crust. pp. 37, 63, pl. viii. fig. 2 (1835); M.-Edw. Ann. Sci. Nat. (sér. 3) Zool. xx. p. 199 (1853).

*Platygrapsus depressus*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 104 (1858).

Two small specimens (male and female) are in the collection. These differ from the description and figure of De Haan, and from an adult male of *P. depressus* in the British-Museum collection, in the existence of a small spine on the wrist at the antero-internal angle; and the posterior tooth of the lateral margins of the carapace is obsolete in one, and very obscurely indicated in the other specimen. The hands are slenderer, and the fingers straight and regularly denticulated on their inner margins, whereas in the adult male the fingers are arcuate and the upper has on its inner margin near the base a large and prominent tooth.

Matoya,  $6\frac{1}{2}$  fathoms; lat.  $34^{\circ} 13' N.$ , long.  $136^{\circ} 73' E.$ , 48 fathoms.

This species is a common inhabitant of the Chinese and Japanese seas.

The generic name instituted by De Haan, *Platynotus*, having been previously employed, was changed by Stimpson to *Platygrapsus*. A second species, *P. convexiusculus*, described by Stimpson from the Loo-Choo Islands, is scarcely sufficiently distinguished by the characters given.

The genus *Platygrapsus* is distinguishable from *Heterograpsus* and other allied genera, with which it has affinities and which are represented in the Japanese seas, by the form of the second and third joints of the outer maxillipeds, which are *obliquely* articulated with one another, whereas in those genera the margins along which the articulation takes place are *at right angles* with the lateral margins of the joints.

#### HELICE TRIDENS.

*Ocypode (Helice) tridens*, De Haan, Faun. Japon., Crust. pp. 28, 57, pl. xi. fig. 2, and pl. xv. fig. 6 (1835).

*Helice tridens*, M.-Edw. Ann. Sci. Nat. (sér. 3), Zool. xx. p. 189 (1853); Stimpson, Proc. Ac. Nat. Sci. Phil. p. 105 (1858).

E. Japan, Yamada, lat.  $39^{\circ} 32' N.$ , long.  $141^{\circ} 53' E.$ , at depth of 7 fathoms; bottom sandy, with broken shells.

A single specimen, an adult female, in the collection. Length 1 inch, breadth nearly 1 inch 4 lines.

This fine species was previously unrepresented in the British-Museum collection.

#### LEIOLOPHUS PLANISSIMUS.

*Cancer planissimus*, Herbst, Naturg. Krabben u. Krebse, iii. pl. lix. fig. 3 (1804),

*Plagusia clavimana*, Desm. Consid. Crust. p. 127, pl. xiv. fig. 2 (1825); M.-Edw. Hist. Nat. Crust. ii. p. 92 (1837).

*Acanthopus planissimus*, De Haan, Faun. Japon., Crust. p. 30 (1835).

*Leiolophus planissimus*, Miers, Cat. New-Zeal. Crust. p. 46 (1876); Ann. & Mag. Nat. Hist. (ser. 4) i. p. 153 (1878)

Four examples, a male and three females, without definite locality, are in the collection.

This species is very widely distributed, occurring both in the Indo-Pacific and Atlantic Regions.

#### CARCINOPLACIDÆ.

##### HETEROPLAX? NITIDUS, sp. n. (Plate II. fig. 2.)

Carapace smooth, glabrous and shining, subtrapezoidal, transverse, its greatest breadth being at the level of the second lateral marginal tooth; in front of this the carapace and frontal region is obliquely deflexed; behind it the carapace is nearly flat, and the lateral margins straight and slightly convergent to the straight posterior margin. Lateral margins with two small teeth, including the outer orbital tooth. Front about one third the breadth of the anterior margin of the carapace, with the anterior margin straight. Eyes about equalling the front. Antennæ with the first joint about twice as long as the second, which is small, occupying the hiatus between the inner angle of the orbit and the frontal margin. Outer maxillipeds with the third joint quadrate, and about half as long as the second joint, which is smooth and longitudinally sulcated on its outer surface; exognath robust.

Anterior legs (in the female) rather robust; arm very short, smooth; wrist smooth externally, and with a small tubercle on its inner surface; hand smooth, without tubercles or granules; fingers straight and acute, crossing at the tips when closed. Postabdomen of female 7-jointed. Length 3 lines, breadth rather over 4 lines. Colour whitish; brownish pink on front of carapace.

A single specimen, a female, was collected at a depth of 40 fathoms in the Corean Straits, lat.  $33^{\circ} 40' N.$ , long.  $182^{\circ} 55' E.$

I have some doubt whether this species should be referred to the genus *Heteroplax*, which is only known to me by Stimpson's diagnosis, according to which the basal antennal joint is longer and occupies the orbital hiatus. The species in other respects appears referable to the genus. The longitudinal ridges on the palate are distinct. In this character and in the broader front and shorter eyepeduncles it differs from *Gonoplax*, while *Litocheira* of Kinahan, another allied form, has, on the contrary, much shorter eyes and broader and less deflexed front than the species here described. Specimens of the species *L. bispinosa*, on which the last-mentioned genus was founded, are in the British-Museum collection from Australia; and in these the longitudinal palatal ridges are distinctly marked. Kinahan, however, in his description says that they do not exist.

## RHIZOPIDÆ.

## TYPHLOCARCINUS VILLOSUS.

*Typhlocarcinus villosus*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 96 (1858).

A very small male individual is in the collection, without definite locality, which I refer to this species. The carapace and legs are clothed with a dense, short, whitish pubescence, with longer hairs on the margins, near which the scattered granules, which are elsewhere probably concealed by the hairy coat, are visible. The hands are covered with minute subseriate acute granules. The antero-lateral marginal teeth are very small, and can only be seen by removing the hairs. Length  $2\frac{1}{2}$ , breadth 3 lines.

The specimen agrees with one (a female of larger size) from the Chinese seas, in the British Museum, presented by the Smithsonian Institution.

## OXYSTOMATA vel LEUCOSIIDÆ.

## LEUCOSIIDÆ.

## LEUCOSIA HÆMATOSTICTA, junior?

*Leucosia hæmatosticta*, Ad. and White, Zool. Samarang, Crust. p. 54, pl. xii. fig. 2 (1848); Bell, Trans. Linn. Soc. xxi. p. 289 (1855); Cat. Leucos. Brit. Mus. p. 8 (1855)

Two specimens were collected, in which the beautiful coloration is very well preserved, and which differ from the typical specimens in the British-Museum collection and White's figure as follows:—The blood-red spots on the carapace and legs are more numerous and smaller, the tubercles on the arms proportionally smaller but similarly disposed, the postabdomen of the male with the sides nearly straight and the second joint not constricted, whereas in the typical *L. hæmatosticta* the second joint is broad at base and greatly narrowed near the distal extremity (see figure quoted). Length of male  $4\frac{1}{2}$  lines.

Lat.  $33^{\circ} 10' N.$ , long.  $129^{\circ} 12' E.$ , at a depth of 36 fathoms. June, 1876. One male. A female is in the collection without definite locality.

The differences mentioned, although at first sight sufficiently marked, are probably due to the difference in age of the specimens, which agree in the form of the carapace, front, thoracic sinus, and legs. The male individual obtained by Mr. Adams measures rather more than  $\frac{1}{2}$  inch ( $6\frac{1}{2}$  lines).

## PSEUDOPHILYRA, gen. nov.

Allied to and intermediate between *Leucosia* and *Philyra*, but differing from the former genus by the absence of the pit or cavity in the subhepatic region which Prof. Bell has called the *thoracic sinus*, and from *Philyra* in the prominent tridentate front and slenderer straighter exognath of the outer maxillipeds.

So far as I am aware, this genus includes only the following species, *Pseudophilypira tridentata* and *Pseudophilypira perryi*, described by



me in 1877 as *Leucosia perryi*, and which is distinguished from *P. tridentata* by the smooth and polished carapace, which is defined by a continuous marginal beaded line. (See Trans. Linn. Soc., Zool. i. p. 238, pl. xxxviii. figs. 19-21, 1877.)

The genus *Leucisca* of MacLeay (*Annulosa* in Smith's Zool. S. Africa, p. 70, 1838), which resembles *Leucosia*, and in which no mention is made of the existence of a *thoracic sinus*, differs from *Pseudophilyra* and *Leucosia* in having the exognath of the outer maxillipeds robust and curved, and the eyes placed on either side at the base of the front, not at the antero-external angles.

*PSEUDOPHILYRA TRIDENTATA*, sp. n. (Plate II. fig. 4.)

Carapace (with front) longer than broad, very coarsely punctulated except on the frontal region, where the punctulations are very fine. Frontal margin tridentate, the front itself narrowed and much produced, as in the genus *Leucosia*. There is a distinct elevation on the hepatic region, and immediately in front of it a marked depression. A minutely beaded line defines the posterior and postero-lateral margins of the carapace, becoming obsolete on the antero-lateral margin. The inferior surface of the body is smooth; the exognath of the outer maxillipeds is rather broad, but its outer margin nearly straight, not arcuated as usual in *Philyra*. The postabdomen of the male has all the joints except the last coalescent, but the sutures are not entirely obliterated. Colour light brownish-pink. Length  $4\frac{1}{2}$ , breadth 4 lines.

One specimen, a male, was collected in lat.  $33^{\circ} 4' N.$ , long.  $129^{\circ} 18' E.$ , in 23 fms.

In this specimen the legs are unfortunately wanting; an anterior leg that was in the same phial, and probably belongs to the specimen, has the arm very finely tuberculated, wrist and hand smooth, fingers slightly gaping at base when closed.

*PHILYRA*, sp.

Several specimens (males and females) of a species of *Philyra*, on account of their small size (their length is only about 3 lines), I do not designate by a distinct specific name, as they may not be fully matured. They resemble *Ph. platycheira*, De Haan, in the form of the carapace, which is nearly smooth and marked with a distinct depression between the cardiac and branchial regions, in the very finely granulated arms, &c. The anterior legs, however, are much shorter than in that species, the palm shorter and more swollen, and the fingers less compressed. The pterygostomial region is not angulated, and the intestinal region rather convex. From the *P. pisum* described by De Haan this species differs in the non-angulated pterygostomial region, from the *P. tuberculosa*, Stimpson, from Hong-Kong, in the non-tuberculated carapace, and from the *P. unidentata*, Stimpson, from the China Sea, in the form of the front. It may not improbably be a distinct species from any hitherto described.

Collected at Matoya, in  $6\frac{1}{2}$  fms.

The colour is light yellowish brown, flecked with spots of darker brown, of which two are rather prominent and situated one on each branchial region.

### MYRA.

The species of this genus, all of which occur in the seas of Eastern Asia, bear a very close resemblance to one another; and the form and tuberculation of the carapace and anterior legs not improbably alter considerably as the animal increases in age. On this account it is not without much hesitation that I regard the specimens described below as belonging to a distinct and undescribed form, as they are all of small size; but they cannot, in the present state of our knowledge, be referred to any of the known species.

#### MYRA DUBIA, sp. n.

Carapace convex, rhomboid-oval, longer than broad, and covered with minute distant granules; there is a faintly but distinctly marked longitudinal median raised line. The median spine or tubercle is but little longer than the lateral ones, conical and acute; and a short distance in front of it, on the front of the intestinal region, is another very small but distinct tubercle. Front and hepatic regions as in *Myra carinata*. Anterior legs about twice as long as the body, slender; arm distinctly and hand finely granulated; fingers straight and acute. Postabdomen of the male elongate-triangular, with the sides nearly straight; surface smooth and flat; all the joints except the last coalescent. Length  $6\frac{1}{2}$  lines, breadth  $5\frac{1}{2}$  lines.

Three specimens, males, are in the collection, without definite locality.

The nearest ally of this species is evidently the *Myra carinata* of Bell from the Philippines, from which it differs in the broader carapace with shorter median posterior spine. Moreover it differs from this and all the other species of the genus in the existence of the small tubercle in front of the posterior spine. There is, however, in the British-Museum collection a male individual from Hong-Kong, of much larger size, which *may* be identical with the Japanese species, in which the tubercle does not exist. From *Myra fugax*, *affinis*, *elegans*, and *mamillaris* it differs in the form of the tubercles of the posterior margin and postabdomen of the male.

#### EBALIA RHOMBOIDALIS, sp. n.

Carapace rhomboidal, rather broader than long, uniformly and finely granulated; cardiac and intestinal regions convex but not tuberculated. Frontal margin straight. Antero-lateral margins straight and not interrupted, forming nearly a right angle with the postero-lateral margins, which are nearly straight; posterior margin, behind the intestinal prominence, obscurely bilobed. A moderately prominent longitudinal median ridge joins the front and the intestinal prominence with the elevated cardiac region; and from the cardiac and intestinal regions transverse ridges reach to the postero-lateral margins. There is no tubercle on the pterygostomian

region. Anterior legs rather long and nearly smooth; arm obscurely trigonous, but without prominent angles; palm moderately convex; fingers straight and acute. Postabdomen of male with all the segments except the last coalescent. Length  $5\frac{1}{2}$  lines, breadth 6 lines.

A male and female are in the collection, without definite locality.

This species differs from most of the genus in the entire absence of tubercles upon the carapace. It has some affinity with *Ebalia tuberosa*, Pennant (*E. pennantii*, Leach), from the British seas, but differs in the uninterrupted lateral margins and in the form of the front, which in that species is concave.

#### EBALIA MINOR, sp. n.

This species resembles the preceding; but the carapace is broader and very much more coarsely granulated on the frontal, cardiac, branchial, and intestinal regions and antero-lateral and postero-lateral margins. The front is slightly concave. The intestinal region is much less prominent, and there is scarcely any trace of longitudinal and transverse ridges; the posterior and postero-lateral margin of the carapace is slightly revolute. Length 3 lines, breadth  $3\frac{1}{2}$  lines.

Three males and one female were collected with the preceding; and all are of much smaller size than the fully-grown male of the preceding species, to which they bear much external resemblance. The distinctions, however, are not sexual, and appear too considerable for the two forms to be varieties of one and the same species.

#### EBALIA BITUBERCULATA, sp. n.

This species resembles the *E. rhomboidalis*; but the longitudinal and transverse ridges on the carapace and the depressions on the branchial region are much more strongly marked; in the centre of the carapace, upon the branchial region, are two distinct tubercles; the posterior margin is broader and straight, not bilobed.

A single female example was obtained at 52 fms., in lat.  $34^{\circ} 12'$  N., long.  $136^{\circ} 28'$  E.

#### CRYPTOCNEMUS PENTAGONUS. (Plate II. fig. 5.)

*Cryptocnemus pentagonus*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 161 (1858).

A single male individual is in the collection, obtained at 36 fms., in lat.  $33^{\circ} 10'$  N., long.  $129^{\circ} 12'$  E., in June 1876. It has unfortunately lost all its legs, but agrees in all respects with Stimpson's description.

This is a most interesting addition to the British-Museum collection, as only three species have been described, the present being the only one not figured hitherto, and that on which the genus was founded. A comparison of the figure now given with that of the *C. holdsworthi* described by me last year in Trans. Linn. Soc. (ser. 2), Zool. i. p. 241, pl. xxxviii. figs. 30–32, will show the differences in the form of the carapace and rostrum between the two species.

## ARCANIA GLOBATA.

*Arcania globata*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 160 (1858).

A single specimen, male, was collected in 24 fms., in lat.  $34^{\circ} 8'$  N., long.  $126^{\circ} 24'$  E.

The legs are unfortunately wanting; but the form and armature of the carapace and rostrum agree exactly with Stimpson's description. Its nearest allies are apparently the *Arcania tuberculata* of Bell (Trans. Linn. Soc. xxi. p. 310, pl. xxxiv. fig. 8, 1855)—from which it differs in the longer, more acute, and equal spines on the surface of the body,—and the *Arcania erinacea* of Fabricius, which has the legs spinulose and the front much more deeply incised. There is a second specimen, from the "Eastern Seas," in the British-Museum collection.

I take this opportunity of noting that the *Arcania granulosa* described by me (Trans. Linn. Soc. ser. 2, Zool. i. p. 240, pl. xxxviii. fig. 29, 1877) must probably be united with the *Arcania 11-spinosa* of De Haan, Faun. Japon., Crust. p. 135, pl. xxxiii. fig. 8 (1841), the characters given not being sufficient to distinguish it from that species.

## ARCANIA ORIENTALIS, sp. n.

Carapace subglobose, compressed, with the front somewhat produced, and with two depressions, well defined posteriorly, separating the cardiac and branchial regions; the whole of the upper surface covered with small closely-placed granules. Cardiac and intestinal regions very high and convex. Front slightly bilobed, with a median sulcus between the eyes; lateral margins of the carapace without spines; posterior margin straight, and forming on each side a prominent but rounded angle with the postero-lateral margins. Anterior legs rather slender, with the arm very finely granulated; wrist and hand nearly smooth. Postabdomen of the male narrow-triangular, with all the joints except the first and last coalescent; the coalesced portion is marked with a longitudinal median sulcus, a prominence on each side at base, and a prominent acute tubercle at the distal extremity, the terminal joint is narrow and elongated. Length and breadth about 3 lines.

Two individuals, males, are in the collection:—one obtained in lat.  $33^{\circ} 10'$  N., long.  $129^{\circ} 12'$  E., at 36 fms.; the other at 30 fms., in lat.  $34^{\circ} 10'$  N., and long.  $136^{\circ} 47'$  E.

This species is distinguished from its congeners by the evenly granulated carapace, which is quite destitute of spines. The granules in one specimen preserve some faint traces of a red coloration.

ANOMURA<sup>1</sup>.

## DROMIDEA.

## DROMIDÆ.

## CRYPTODROMIA, sp.

A very small specimen, obtained at 30 fathoms, in lat.  $34^{\circ} 10'$  N., long.  $136^{\circ} 47'$  E., is in the collection.

<sup>1</sup> For convenience' sake, Dana's arrangement and nomenclature of the groups of *Anomura* is followed.

The frontal portion of the carapace is triangular, deflexed, concave above, with five obscure marginal teeth (including the supraocular and median frontal teeth). Carapace convex, sparsely pubescent, without any indication of the different regions; antero-lateral margin with three small teeth. The anterior legs are small, weak, pubescent, and smooth. The second and third legs are compressed, pubescent, and with a tubercle at the distal extremity of the penultimate and antepenultimate joints. This individual may be the young of *C. tumida*, Stimpson, from the island of Ousima; it would not in any case be desirable to constitute it the type of a new species. Length barely 3 lines. The specimen is a young male.

### HOMOLIDÆ?

#### PARATYMOLUS.

The carapace is shaped nearly as in *Homola*, e. g. with the front and postfrontal region deflexed, behind the hepatic region flat, with the sides nearly straight. The front is prominent and narrow, composed of two coalescent spines. The antennules are small and apparently broken in the single specimen collected. The antennæ are elongated, the joints of the peduncle hairy, the flagella very slender. The eyes are slender, of normal shape, the peduncles cylindrical and laterally projecting, not, as in *Homola*, divided into two portions. The outer maxillipeds are rather slender, the second about twice as long as the third joint, the exognath slender and not prolonged beyond the end of the third joint. The anterior legs in the female very slender, fingers longer than the slender palm; the ambulatory legs all alike in form, slender, smooth, the tarsal joints long, straight, and unarmed, those of the fifth pair not raised upon the dorsal surface of the cephalothorax. Postabdomen (of female) jointed, ovate.

The systematic position of this genus is somewhat uncertain, as the specimen, which is unique and very small, cannot be dissected with safety. Stimpson placed his genus *Tymolus* among the *Dorippidæ*; but the outer maxillipeds of *Paratymolus* are more of the Maioid than of the Leucosiid type; and on account of its general resemblance to *Homola* I place it, at least provisionally, with that genus among the Anomura Maiidica. Although the legs are not dorsally raised upon the cephalothorax, it evinces a certain degradation from the Brachyural type in the absence of defined orbits, the long antennæ, and several other points; but it may hereafter be thought better to place it among the Maioid Brachyura. The outer maxillipeds are less pediform than in *Homola*, but less distinctly operculiform than in the generality of Maioid Crustaceans.

#### PARATYMOLUS PUBESCENS, sp. n. (Plate II. fig. 6.)

Carapace and legs everywhere covered with a close velvety pubescence; a strong spine at the angle of the hepatic region, and another smaller in front of it, two small tubercles in front of the gastric and one on the cardiac region, and two in the middle of the

postero-lateral margin. Arms smooth; wrist with a long spine on its inner margin. The slender terminal joints of the legs are longer than the preceding joints. Length of carapace and rostrum barely 3 lines.

A single female example was collected at Matoya, at a depth of  $6\frac{1}{2}$  fms.

This specimen is of very small size; but in the form of the fifth ambulatory legs it appears to be generically distinct, both from *Homola* and *Tymolus*, an allied genus from the Japanese seas, described by Stimpson; from the former genus it is further distinguished by the form of the eyes, and from the latter by that of the front, which is not quadridentate.

#### RANINIDEA.

##### RANINA SERRATA.

*Cancer raninus*, Linn. Syst. Nat. (ed. xii.), p. 1039 (1766).

*Ranina serrata*, Lam. Syst. An. sans Vert. p. 256 (1801); M.-Edw. Crust. in Cuvier, Règne Animal (ed 3), Atlas, pl. xli; Dana, U.S. Expl. Exp. xiii. Crust. i. p. 404 (1852).

*Ranina dentata*, Latr. Encycl. Méth. p. 268 (1825); M.-Edw. Hist. Nat. Crust. ii. p. 194, pl. xxi. figs. 1-4 (1837); De Haan, Faun. Japon., Crust. p. 139, pl. xxxiv. ♂ adult, pl. xxxv. fig. 1, ♀ adult, figs. 2 & 3, front of ♂, fig. 4, front of ♀ (1841).

A single individual, a male, was collected in Olvasi, Nipon, of moderate size, of this well-known species, which appears to be widely distributed through the Indo-Pacific region.

##### LYREIDEUS TRIDENTATUS?

*Lyreideus tridentatus*, De Haan, Faun. Japon., Crust. p. 140, pl. v. fig. 6 (1849).

A single specimen in imperfect condition was collected in Kada Bay, which I refer to De Haan's species with some doubt, as it differs in several particulars from the figure in the 'Fauna Japonica,' and the figures illustrating this work are, as a rule, most accurate. The carapace in the specimen before me is proportionally narrower, barely equalling in width half the total length. The greatest width at the lateral spines is attained at a greater distance from the front than in the specimen figured by De Haan; the median triangular lobe of the front is narrower; and there are four spines on the inferior margin of the hand.

If the species should prove upon comparison to be distinct, it may be designated *L. elongatus*. It in any case forms an interesting and valuable addition to the national collection, in which the genus was hitherto unrepresented; nor does it appear that any specimens were collected in the United States Expedition to the North Pacific, as none are mentioned in Stimpson's Report.

#### PORCELLANIDEA.

##### PORCELLANA SPINULIFRONS, sp. n.

Two small specimens are in the collection, the exact locality

whence they were obtained not being stated. They differ from the description of *P. latifrons* Stimpson (Proc. Ac. Nat. Sci. Phil. p. 243, 1858), only in the following particulars. There are only two spines on the lateral margins of the carapace in front of the branchial regions, and one behind the outer orbital spine. The denticulations of the frontal lobes are very minute, but more numerous than in *P. latifrons*—about 9 on the median lobe and 4 on each lateral lobe; there are only two spines on the posterior margin of the carpus.

It is possible that a larger series would show these differences are not of specific importance.

#### *PACHYCHELES STEVENSII.*

*Pachycheles stevensii*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 242 (1858).

Two specimens are in the collection, without definite locality (male and female). This species was previously unrepresented in the collection of the British Museum. Stimpson's specimens were from the west coast of the island of Jesso, Japan.

With one exception (the *P. natalensis*, Krauss) the only species of this genus, besides the two described by Stimpson, inhabit the American coasts—another indication of the affinity existing between its Crustacean fauna and that of the Japanese seas.

### LITHODIDEA.

#### *HAPALOGASTER DENTATUS.*

*Lomis dentata*, De Haan, Faun. Japon., Crust. p. 219, pl. xlviii. fig. 3 (1849).

*Hapalogaster dentatus*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 245 (1858).

A single specimen, female, in mutilated condition, was collected at the Goto Islands at low-water mark. It agrees well with a specimen from Simoda, presented to the British Museum by the Smithsonian Institution.

This species belongs to a genus which, having a boreal range, is found on the west coast of the American continent as well as on the shores of Eastern Asia. An allied species, *H. mertensii*, has been described by Brandt from Sitka, and a third, *H. cavicauda*, by Stimpson from California.

#### *CRYPTOLITHODES EXPANSUS*, sp. n.

The species which I have thus designated is represented only by a single small specimen in dried condition. The carapace is transversely oval, with the lateral wing-like expansions broadly rounded, the surface everywhere minutely punctulated. The rostrum is scarcely at all deflexed, truncated, and but very obscurely tridentate at its distal end. There is a convexity upon the gastric, and one more prominent upon the cardiac region, on either side of which is a less elevated tubercle, the three forming a transverse series. A longitudinal median ridge extends from the gastric prominence

nearly to the distal end of the rostrum. There are no tubercles on the lateral expansions of the carapace; but the lateral margins are obscurely toothed, as in *C. typicus*. The anterior legs have the palms tuberculated externally; and the ambulatory legs are cristate, as in that species. Length to end of rostrum  $4\frac{1}{2}$  lines, breadth 6 lines.

North Japan.

From *Cryptolithodes typicus*, Brandt, from California, this species differs in the less-deflexed rostrum, the absence of tubercles on the lateral lobes of the carapace, and the shape of these expansions, which are broadly rounded, with the lateral margins regularly arcuated, whereas in *C. typicus* the latero-anterior and latero-posterior margins form a more or less distinct angle one with another. It is probable that this character will always suffice to differentiate the species, even if the others should fail in older individuals. *C. sitchensis*, Brandt, from Sitka, has, according to Stimpson, a tridentate rostrum and smooth hands.

*C. alta-fissura*, Spence Bate, from Vancouver Island, of which there is a specimen in the Museum, is distinguished by the broad, flat, and rectangular rostrum, and the deep notch in the carapace in which the eyes are situated<sup>1</sup>.

#### PAGURIDEA.

EUPAGURUS CAVIMANUS, sp. n. (Plate III. fig. 1.)

Carapace slightly punctulated on the sides in front of the branchial regions, and with a small acute median frontal lobe. Eye-peduncles subcylindrical, scarcely shorter than the peduncles of the antennæ, not constricted in the middle, their basal scales entire, and concave above. Antennules with the peduncles rather longer than the eyes. Antennæ with their slender basal acicles a little shorter than the peduncles. Anterior legs very unequal; larger (right) leg with the arm very short, trigonous, concave on its outer surface, and with a few spinules on its distal upper margin; wrist about as long as broad, and much broadest at its distal extremity, convex and faintly punctulated on its outer surface, its inner surface smooth and concave, and its upper and lower margins distally produced into thin crests, the upper of which is obscurely serrated; hand with the upper and lower margins parallel and subcristiform, slightly convex, and nearly smooth on its outer surface, mobile finger not cristate above, and about as long as the upper margin of the palm. Smaller leg very slender, wrist externally granulated and serrated above; palm subovate, smooth, and concave on its outer surface. Legs of second and third pairs slender, nearly smooth, the terminal joints rather longer than the preceding, and with short stiff hairs on their upper and lower margins.

<sup>1</sup> There is also a dried specimen in the Museum, from Vancouver Island, which closely resembles *C. typicus*, but is distinguished by the form of the rostrum, which is obtusely triangular, and does not project beyond the anterior margin of the carapace. This I propose to designate *C. brevifrons*.



One individual was collected at a depth of 100 fathoms, in lat.  $41^{\circ} 40' N.$ , long.  $141^{\circ} 10' E.$

By the form of the ophthalmic scales, the dilated carpus of the right anterior leg, and the externally concave palm of the left anterior leg, this species is easily distinguishable from its congeners.

It does not seem to be allied in any close degree to any of the species described by Stimpson from the Chinese and Japanese seas. In *Eupagurus forceps*, M.-Edw., a Chilian species, which has the wrist of the larger hand strongly cristate above and beneath, the fingers of the smaller hand are described as being very long, slender, and acute, whereas in *E. cavimanus* they are of moderate length.

There are a few other specimens of Paguridea in the collection, which, being in mutilated condition, cannot be determined with certainty. One, obtained at the Goto Islands at low-water mark, has lost the postabdomen and one of the anterior legs, but is perhaps referable to the *Pagurus lanuginosus* of De Haan. Another, which, like *Pomatocheles jeffreysii*, inhabited a shell of *Dentalium*, is too imperfect to be described.

#### POMATOCHELES, gen. nov.<sup>1</sup>

Cephalothorax and its appendages as in the *Paguridæ*. Carapace with a median frontal lobe, and postfrontal and other sutures; posteriorly it is partly membranaceous. Postabdomen as in the *Macrura*, extended, straight, with parallel sides, composed of seven distinct segments, inferiorly closed by two longitudinally-folding membranaceous flaps, which meet in the middle line. Eye-peduncles slender, cylindrical, straight. Antennules and antennæ rather short, the latter with simple multiarticulate flagella. Antennal aciculum small. Outer maxillipeds subpediform. Anterior legs (as in *Cancel-lus*) equal; hands bent obliquely downwards from the wrists, and flattened above, fingers opening horizontally, and acute at tips. Second and third legs slender, elongated, terminal joints long, straight, and acute. Fourth and fifth legs small and weak; last joint of fourth pair with a small terminal claw, and that of the fifth pair with a tuft of hairs and minute claw at its distal end. Postabdominal appendages of the second to fifth segments slender, those of the second segment elongated, and 4- or 5-jointed, the rest short. Appendages of the penultimate segment (uropoda) with two lamellate unequal rami. Telson membranaceous in its distal half, and divided by a terminal notch into two rounded lobes.

I have much pleasure in dedicating the single species of this remarkable genus to Dr. J. Gwyn Jeffreys, F.R.S., by whom the entire series of Crustacea collected by Capt. St. John was presented to the British Museum.

POMATOCHELES JEFFREYSII, sp. n. (Plate III. fig. 2.)

The animal is slender and elongated. The carapace is marked

<sup>1</sup>  $\pi\acute{\omega}\mu\alpha$ , a lid, and  $\chi\eta\lambda\acute{\eta}$ , a claw.

with a distinct postfrontal and lateral suture, besides two smaller and less distinct sutures on the sides towards the lateral margins. The median frontal lobe is broadly triangulate and rounded at apex. The first postabdominal segment is very small, the five following subequal, with the lateral margins straight, the last small, transparent, and membranaceous in its distal half, and ciliated on its margins, the terminal median notch very small. The ocular peduncles are a little shorter than the frontal margin, and are furnished with very small scales at base. The corneæ are of a red-brown colour. The antennules are half as long again as the eye-peduncles, the antennæ about as long as the antennules; the aciculum at base very small, acute, not half as long as the eye-peduncles. The anterior legs are much as in *Cancellus*; the arms with a slight denticulated crest on their upper surface, the wrists very short and slightly denticulated above; the flattened upper surface of the palms is covered with thick short hair, the surface beneath being smooth, and the straight inner and arcuate outer margins very slightly denticulated. The slender and elongated legs of the second and third pairs have the antepenultimate joint short, the two following long and straight, the last in particular very long, slender, and acute. The truncated distal end of the last joint of the fourth leg is armed with a series of short stiff setæ or spinules, and a small claw or spine; that of the fifth pair is densely ciliated. The basal portion of the uropoda is short and broad, and bears two unequal lamelliform rami, which are of spongy texture on the outer surface, and ciliated on the margins; the outer is twice as long as the inner. Length 5 lines.

Two specimens were collected, inhabiting a species of *Dentalium*, at a depth of 58 fathoms, in lat.  $32^{\circ} 43' N.$ , long.  $129^{\circ} 28' E.$ , preserved in spirit. They were so firmly ensconced in the narrow conical shell that forms their home, that the one from which the foregoing description was mainly taken could not be extracted without breaking the shell. The chelæ of the anterior legs, meeting above the head, and in close contact along their flat inner margins, form a perfect operculum, fitting the aperture of the shell (hence the name of the genus), serving to defend its inhabitant against foreign intruders.

Subsequently two other specimens, in a dry state, were extracted from specimens of *Dentalium*, collected in 48 fathoms, in lat.  $34^{\circ} 13' N.$ , long.  $136^{\circ} 37' E.$  They appear to be males, as the genital apertures are visible at the base of the fifth legs.

This remarkable form is of great interest as apparently establishing a transition from the Paguridea to the Macrura. In the form of the carapace, eyes, antennæ, and cephalothoracic limbs it has so much affinity with *Cancellus*, that, had the rest of the animal been wanting, I should have considered it a species of that genus. But in the narrow, straight, and distinctly-segmented postabdomen, and in the form of its appendages, it far more nearly approaches the Macrura than does *Cancellus*. Perhaps its nearest allies are to be found in the little-known genus *Prophylax* of Latreille<sup>1</sup>, and *Glauc-*

<sup>1</sup> In Cuv. R. A. (ed. 2), p. 78 (1829).

*cothoë* of Milne-Edwards<sup>1</sup>. The latter, which is placed by Dana in the *Gebiidae*, is only known to me by the figures and descriptions of its author; it presents decided affinities with the *Paguridea* in the form of the fourth and fifth legs of the cephalothorax, eyes, antennæ, and anterior legs, which are more distinctly *Macruran* in type. *Glaucothoë* has been considered by Mr. Spence Bate<sup>2</sup> to be but the immature condition of *Pagurus*; and he figures and notices a specimen of that or a closely-allied genus that had been taken floating on the surface of the sea. Whether his contention be correct or not (and his remarks and figures do not appear to me to suffice to decide the question), there can, I think, be little doubt that the specimens of *Pomatocheles* I have examined are mature; and the fact that they had been found at considerable depths permanently ensconced within the shell of *Dentalium* seems confirmatory of that opinion. From *Glaucothoë Pomatocheles* is easily distinguished by the form of the chelæ of the anterior legs and of the carapace, not to mention other characters.

#### GALATHEIDEA.<sup>1</sup>

##### GALATHEA ORIENTALIS.

*Galathea orientalis*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 252 (1858).

A large series of this species was collected, the specimens agreeing in all respects with Stimpson's description, and the number of spines on the gastric region and lateral margins being remarkably constant; only it is to be noted that the large spine on the inner surface of the wrist varies considerably in size, sometimes not being much larger than the other spinules of the anterior legs; there is usually a small tooth on the inner margin of the immobile finger.

This species, like the *Pilumnus hirsutus* and *Cymodocea trilobata*, to be described in the second part of this Report, is a very common inhabitant of the Chinese seas, having been dredged at no fewer than nine different localities in or near the Corean Straits, at depths varying from 12 to 50 fathoms. Stimpson's specimens were from the Ly-i-moon Straits, near Hong-Kong.

##### MUNIDA JAPONICA.

*Munida japonica*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 252 (1858).

A single specimen was collected in the Corean Straits, lat. 33° 14' N., long. 182° 55' E., at a depth of 40 fathoms. The legs are, unfortunately, wanting; but in the form of the carapace and rostrum, and the number and position of the spines of the cephalothorax, it agrees perfectly with Stimpson's description, whose specimens were collected at Kagosima, Japan.

<sup>1</sup> Ann. Sci. Nat. sér. I, xix. p. 334 (1830); Hist. Nat. Crust. ii. p. 306 (1837); and Atlas, in Ouv. R. A. Crust. (ed. 3), pl. xliii. fig. 2.

<sup>2</sup> Rep. Brit. Assoc. p. 53 (1865); Ann. & Mag. Nat. Hist. ser. 4, ii. p. 115, pl. ix. fig. 3 (1868).

## MACRURA.

## THALASSINIDEA.

## GEBIIDÆ.

## GEBIA MAJOR.

*Gebia major*, De Haan, Faun. Japon., Crust. p. 165, pl. xxxv. fig. 7 (1849).

Several specimens are in the collection from Katsuma and Kada Bay, some obtained from coarse sand and gravel 18 to 20 inches below surface. The spinules on the upper margin of the hand, mentioned by De Haan, are very small, and concealed by the longer hairs, so as to be scarcely distinguishable.

## CARIDEA.

## CRANGONIDÆ.

## PARACRANGON ECHINATUS.

*Paracrangon echinatus*, Dana, Proc. Ac. Nat. Sci. Phil. p. 20 (1852); U.S. Expl. Exp. xiii. Crust. i. p. 538, pl. xxxiii. fig. 6 (1852); Stimpson, Boston Journ. Nat. Hist. v. p. 497 (1857).

A single specimen, apparently a male, was collected north-east of Yedo Island, in lat.  $44^{\circ} 27'$  N., long.  $141^{\circ} 22'$  E., and differs in no respect whatever from the Californian species described by Dana, which was described from specimens dredged in Puget Sound, and of which authentic examples from California are in the Museum collection, presented by the Smithsonian Institution.

The occurrence of the single species known of this curious genus (which, with the hands of a *Crangon*, has the external appearance, elongate rostrum, &c. of a *Hippolyte*, and which is remarkable for the total obsolescence of the cephalothoracic legs of the second pair) on both sides of the Pacific Ocean is a noteworthy fact; and it is probable that, with further opportunities of comparison, other species will be shown to have a similarly extended range.

## ALPHEIDÆ.

## ALPHEUS.

There is probably scarcely any genus of Crustacea in which the species are more numerous, and which more greatly needs thorough revision than the present. Not only are the characters in themselves hardly to be defined and accurately appreciated without the aid of well-executed figures, but we do not know at present how far those which are generally adopted in distinguishing the species (*i. e.* the form and sculpture of the hands and the proportional length of the joints of the wrists of the anterior legs) may be modified by the age and sex of the individual. Under these circumstances it is not without considerable hesitation that I describe below two species as new, which, however, are distinct from any hitherto recorded, so far as I can judge from the materials available to me for comparison.

## ALPHEUS BIS-INCISUS.

*Alpheus bis-incisus*, De Haan, Faun. Japon., Crust. pl. xlv. fig. 3 on plate, *Alpheus avarus* in text, l. c. p. 17; Stimpson, Proc. Ac. Nat. Sci. Phil. p. 30 (1860), nec *Alpheus avarus*, Fabricius, *vide* Stimpson.

Two specimens are in the collection, one female, in fine condition, obtained at Katsura, on the east coast of Japan, and a smaller individual, without definite locality.

Dr. Stimpson, in his report, quoted above, retains the name of *bis-incisus* for a species which he regards as distinct from the *Alpheus avarus* of Fabricius, with which, on the other hand, he considers the *Alpheus strenuus* of Dana (Expl. Exp., Crust. p. 543, pl. xxxiv. fig. 4), from Tongatabu, identical. Both species were collected in the American expedition to the North Pacific; and as I do not know the grounds on which he separated them, I follow for the present his nomenclature—although it would appear from comparison of the figures and descriptions that the *Alpheus bis-incisus* and *A. strenuus* are identical, while the *A. avarus* of Fabricius is described in such general terms that it would apply to several very different species; indeed by Milne-Edwards it is thought to be probably identical with *Alpheus brevirostris* of Olivier, which belongs to a different section of the genus from *A. bis-incisus* and *A. strenuus*.

## ALPHEUS JAPONICUS, sp. n.

Carapace smooth. Rostrum narrow-triangular and acute, projecting rather beyond the orbits, which themselves project beyond the lateral margins of the carapace. Orbits without spines. Between the eyes and rostrum the carapace is very slightly concave. Second joint of the antennules not twice as long as the first. Anterior legs very unequal, the larger with the arm short, trigonous, enlarging distally, with a small spine at the distal end of its upper and lower margin; wrist very small, transverse; hand (with fingers) laterally compressed, very slightly contorted, nearly three times as long as broad; palm smooth, not cristate above, with the upper and lower margins straight and terminating in an acute lobe a short distance behind the articulation of the fingers; on the inner and outer sides of the palm, near the upper margin, is a longitudinal depression gradually obliterated towards the proximal extremity, that on the inner surface is narrow and triangulate, that on the outer broader and oblong in shape; the upper finger is broadest and rounded at its distal extremity, with a large tooth on its inner margin, fitting into a corresponding cavity on the inner margin of the lower finger; both are slightly hairy: the other anterior leg is slightly longer but very much more slender than the first described, which it resembles in the shape of the arm and wrist; the hand is very slender, smooth, and straight, no thicker than the wrist, the fingers hairy, and very slightly longer than the palm; the first joint of the wrist is longest, the third subequal and shortest, the fifth but little longer than the

third. The outer maxillipeds are densely hairy towards the extremities; the ambulatory legs slightly hairy on the penultimate joints.

Length of largest specimen about  $1\frac{1}{2}$  inch.

Two specimens were collected:—one in lat.  $34^{\circ} 6' N.$ , long.  $136^{\circ} 15' E.$ , at 11 fathoms; the other in lat.  $35^{\circ} 7' N.$ , long.  $136^{\circ} 55' E.$ , at 3 fathoms, on a bottom of soft mud.

So far as can be judged from the descriptions of the numerous species of this genus, the one now described differs from all those of the same section (in which the rostrum rises from the margin of the front, the basal joint of the antennæ is without a spine, the larger hand excavated above and below, and the orbital margins without spinules) in the form and proportions of the anterior legs. The anterior legs somewhat resemble those of *A. bis-incisus* and *A. lobidens*, De Haan, but are much more slender and elongate, there is a spine at the distal end of both the upper and lower margins of the arms, and the lobes terminating the upper and lower margins of the larger hand are both acute.

*ALPHEUS KINGSLEYI*, sp. n.

Carapace smooth; upper orbital margins rounded and without spines. Rostrum acute, projecting little beyond the orbits, between the eyes very narrow-linear, and separated from them by deep depressions in the surface of the carapace. Antennules with the second joint of the peduncle more than twice as long as the first, and, like the antennæ, without a basal spine. Antennal scale narrow, with a prominent spine at its antero-external angle. Anterior legs very finely granulated, the margins of palms and fingers with long flexible hairs; in the larger (right) leg the arm is without spines at its distal extremity; wrist very small, transverse; hand (with fingers) rather more than twice as long as broad, laterally compressed; palm with its upper margin marked with two longitudinal lines of long hairs, and with a small transverse groove near the base of the mobile finger, inner and outer surface smooth, not carinated, outer surface slightly concave below upper margin, with a faintly-marked oblique impressed line near its base; lower margin straight, entire, subacute; fingers nearly as long as the palm, nearly straight, the upper broad and bluntly rounded at its distal extremity: the other leg is slender, smooth, the palm compressed, the fingers about twice as long as the palm, slightly arcuated, leaving a space between their inner margins, and crossing at the tips when closed. The second pair of legs has the first and second joints of the carpus each nearly as long as the three following together, the third and fourth joints being very short, the fifth but little longer. The dactyli of the following legs are slender and straight. Length about 1 inch 1 line.

One individual is in the collection, obtained with a specimen of the preceding species, in lat.  $35^{\circ} 7' N.$ , long.  $136^{\circ} 55' E.$ , at 3 fathoms, on a muddy bottom.

This species, on account of the form of the front and anterior legs, belongs to a small section of the genus *Alpheus* including the *A.*

*brevirostris*, Olivier, and *A. lobidens*, De Haan, and the *A. malabaricus* and *A. rapax*, Fabricius, as described and figured by the latter-mentioned author in the 'Fauna Japonica.' From the *A. brevirostris* it differs in the absence of crests upon the upper surface of the larger hand, the finger of which is proportionally much longer, and nearly straight, and from the three other species in the absence of ridges on the outer and inner surface of the palm, and of spines at the distal extremity of the arm, &c. It is evidently very nearly allied to *A. rapax*, which, however, is described (De Haan, *l. c.*) as having "*manus major glabra 4-costata, brachia carina superiore apice unispinosa.*"

I dedicate this species to Mr. J. S. Kingsley, of Salem, U. S., who, by his recent researches, has greatly facilitated the determination of the American species of this genus.

#### ALPHEUS GRACILIPES?

? *Alpheus gracilipes*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 31 (1860).

I refer to this species with some hesitation a small individual collected in lat. 32° 49' N., long. 128° 54' E. It agrees in all particulars with Stimpson's description, based on a specimen from Tahiti, except that the orbits can scarcely be called acute in front, and the penultimate joint of the ambulatory legs is about 6-spined below. I may add that the larger hand is sparsely pilose and slightly twisted, the mobile finger about one third the total length of the hand. The smaller hand is wanting in the specimen.

#### RHYNCHOCYCLUS PLANIROSTRIS.

*Cyclorhynchus planirostris*, De Haan, Faun. Japon., Crust. p. 175, pl. xlv. fig. 7 (1849).

*Rhynchocyclus planirostris*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 27 (1860).

*Rhynchocyclus mucronatus*, Stimpson, *l. c.* p. 28 (1860), var.

One adult female, with ova, was collected at Cape Sima, Nippon, at a depth of 18 fathoms, on a bottom of sand and broken shells, and one, apparently male, in the Gulf of Yedo. It is to be noted that in neither specimen is the wrist carinated above and spinose at apex, as in De Haan's description. In all other respects the female, however, agrees with the description and figure of that author. The second specimen, in the somewhat narrower longer rostrum, and the existence of but a single spine on the dorsal surface of the carapace, agrees with Stimpson's diagnosis of *R. mucronatus*, which was based on specimens collected in the Strait of Ly-i-moon, near Hong Kong; but the denticles on the anterior margin of the rostrum are more numerous in both individuals. In both, moreover, exist the spines on the anterior margin of the carapace, mentioned by Stimpson; and in both the joints of the wrist are of the same proportional length, *i. e.* the second longer than either the first and third. It is probable that Stimpson's species is at most a mere

variety of the *planirostris*; or the differences may be those peculiar to the male sex.

HIPPOLYTE LEPTOGNATHA, var.

? *Hippolyte leptognatha*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 34 (1860).

Rather slender. Carapace dorsally carinated, the carina reaching nearly to the posterior margin; anterior margin with two small spines below the eye, and another at the antero-inferior angle. Rostrum elongated, longer than the carapace, its apex reaching beyond the end of the shorter thickened flagellum of the antennules; its upper margin straight, horizontal, and 6-dentate, the two or three last teeth situate on the dorsal crest, inferior margin with about six small and crowded teeth. The postabdomen is strongly geniculated. The outer maxillipeds slender and elongated, reaching nearly to the apex of the rostrum. Anterior legs rather slender; the palm longer than the fingers, and rather longer than the wrist. Wrist of second pair of legs 7-jointed, the second and sixth joints shortest, and the third joint the longest. Only one of the following legs exists in the specimen before me; in this the merus joint is armed with a series of spinules on its inferior margin, the penultimate joint is long, and the last joint short.

The single specimen, a female with ova, was collected in the Gulf of Yedo, and is in a mutilated condition.

It agrees in so many particulars with Stimpson's description of *H. leptognatha*, from Hakodadi, that I have not ventured to consider it distinct; as will be seen from the description, however, it differs in the more numerous teeth of the rostrum, of which fewer are placed on the dorsal surface of the carapace.

PANDALUS GRACILIS.

*Pandalus gracilis*, Stimpson, Proc. Ac. Nat. Sci. Phil. p. 37 (1860).

A single specimen was obtained in the Korean Straits, in lat. 34° 8' N., long. 126° 24' E.; temp. of water 71°, at a depth of 17 fathoms. It is in a very mutilated condition, the legs being imperfect and rostrum broken at the tip; but it agrees well with Stimpson's description and a specimen presented by the Smithsonian Institution from Hakodadi.

PENÆIDEA.

PENÆIDE.

PENÆUS AFFINIS, M.-Edw.

*Penæus affinis*, M.-Edw. Hist. Nat. Crust. ii. p. 416 (1837); De Haan, Faun. Japon., Crust. p. 192, pl. xlv. fig. 3, *barbatus* on plate (1849); Miers, Proc. Zool. Soc. p. 304 (1878).

*Penæus velutinus*, Dana, U.S. Expl. Exp. xiii., Crust. i. p. 604, pl. xl. fig. 4 (1852).

One male individual, was collected in lat. 32° 49' N., long. 128° 54' E.



This species has apparently a very wide geographical range, as there are specimens which do not seem to differ specifically in the British Museum from the Gulf of Suez and Western Australia; and I am informed in a letter from Mr. J. S. Kingsley, of the Peabody Academy of Science, Massachusetts, that the Museum of that Institution possesses specimens from Hong-Kong, the Sandwich Islands, and Zanzibar.

### CUMACEA.

#### HETEROCUMA, gen. nov.

Cephalothorax without a distinct rostrum, and (viewed laterally) nearly straight in its dorsal outline. Five free segments of the body exposed. Postabdomen much longer than the carapace, terminal segment obsolete. Eye large and distinct. Antennules robust, 5-jointed, without any accessory flagellum, and with the first three joints of the peduncle dilated. Mandibles with the apex strongly dentated, the inner margins armed with 10-12 stiff setæ and with a prominent molar tubercle. First maxillæ with the slender flagella terminating in two unequal setæ. First and second maxillipeds 6-jointed, third maxillipeds 6-jointed, the basal joint considerably dilated, and produced at its extero-distal angle, which is subacute, the second joint very short, transverse, the third with its extero-distal angle greatly produced and acuminate, the fourth dilated and truncated at its distal extremity, and the fifth and sixth slender. First three pairs of legs palpigerous in both sexes. The appendages of the sixth postabdominal segment (uropoda) are elongated, the basal portion being about as long as the fifth postabdominal segment, and terminating in two flattened subequal rami, which are two-jointed and about as long as the base.

In the males there exist well-developed appendages on the ventral surface of the first five postabdominal segments, and the antennæ are well developed and have the last joint of the peduncle dilated and terminate in a slender flagellum, which is directed backward and is as long as the animal.

This genus is apparently nearly allied to *Eudorella*, Norman (*Eudora*, S. Bate), which it resembles in general form, the obsolescence of the terminal postabdominal segment, the form of the uropoda, &c., but differs in the existence of a well-developed eye, in the structure of the flagellum of the first maxilla, which terminates in two setæ, and particularly in the dilatation of the third and fourth joints of the third pair of maxillipeds. In the males, moreover, the first five postabdominal segments are all furnished with appendages.

It is also very nearly allied to *Leptocuma*, Sars, from Rio Plata, a genus recently described and beautifully figured by its distinguished author in Kongl. Vetensk.-Akad. Handl. xi. no. 5, p. 24; but in that genus the eye is indistinct, and not furnished with cornæ, the first pair of legs more robust, and, moreover, the third maxillipeds (so far as they could be seen without dissection in the unique specimen) are described as "of perfectly normal structure" in *Leptocuma*.

*HETEROCUMA SARSI*, sp. n. (Plate III. fig. 3.)

The body is slender; the carapace or dorsal shield is somewhat laterally compressed, with an obscure median dorsal keel, which is flattened and sulcated posteriorly, and terminates anteriorly in the oculigerous lobe. Viewed laterally, the dorsal outline of the carapace is nearly straight, the inferior or lateral margin is at first straight and parallel with the upper, but anteriorly it is curved upward toward the front. The antero-lateral margins meet in front of the eye, but are not prolonged into a rostrum. The surface is smooth, or only very minutely punctulated; on either side there is a wide and rather deep incision in the antero-lateral margin, through which the antennules are visible; and the lobe beneath the sinus is triangular and subacute.

Five free segments of the body are exposed, the first being very narrow and overlapped upon the sides by the carapace; the second is longest, with the latero-inferior margins straight; the third very short upon the dorsal surface, but, like the two following, produced backward at its postero-lateral angle. Similarly the first four post-abdominal segments are produced backward on the sides, the produced portion forming a subacute lobe; these segments are subequal, the fifth is longer, the sixth rather smaller than any of the preceding; all are marked with longitudinal depressions on the dorsal surface, which are best visible in the dried specimens; the last segment or telson is represented only by an obscurely bilobate tubercle.

The large black eye is placed immediately behind the frontal margin. The antennules, visible through the lateral sinus, are short and 5-jointed, the basal joint very short, the second longest and considerably dilated, the third dilated and shorter, the fourth slender and longer, and the fifth very small and ending in a pencil of setæ. The first pair of legs are greatly elongated and slender, the extremity being clothed with a pencil of long setæ, which arise near the distal end of the penultimate joint; the fifth pair of legs is very short. The appendages of the first five postabdominal segments in the male are biramose; the rami flattened, ovate, and fringed at their distal extremities with long and flexible cilia; those of the sixth segment (uropoda) are fringed with short stiff setæ along the inner margins of the base and the inner ramus, of which the two joints are subequal; in the outer ramus the basal joint is much shorter than the terminal. Length of animal (excluding appendages) not exceeding  $\frac{3}{4}$  inch.

A good series of specimens of both sexes were collected at a depth of 40 fathoms in lat.  $32^{\circ} 41' N.$ , long.  $128^{\circ} 57' E.$ ; one (a male) occurred at a depth of 50 fathoms, in lat.  $33^{\circ} 19' N.$ , long.  $129^{\circ} 7\frac{1}{2}' E.$ ; and two males and a female were taken in lat.  $32^{\circ} 49' N.$ , long.  $128^{\circ} 56' E.$

**Var. GRANULATA.**

In two or three specimens (male and female), collected, with the typical form, in 40 fathoms, in lat.  $32^{\circ} 41' N.$ , long.  $128^{\circ} 57' E.$ ,

the carapace is more or less covered on its dorsal surface with small tuberculiform granules, which are largest along the line of the median dorsal carina, and are gradually obliterated toward the lateral margins.

As in all other respects these specimens resemble the typical forms, I have not ventured to regard them as belonging to a distinct species<sup>1</sup>.

## APPENDIX.

*On the Method of Dredging and Separating the Specimens, &c., with Remarks on Temperature, &c.* By Capt. H. C. ST. JOHN, R.N.

During the years 1870 to 1877, when employed surveying the Japanese coasts, I usually kept a small dredge pretty well at work.

There is so little trouble and the few arrangements necessary are so simple, that I venture to give a brief outline of the plan I adopted, hoping, if it meets the eyes of those who have business on the deep, that they might be induced, at any rate occasionally, to try their luck in a similar way.

After ascertaining the depth, the dredge (which was always kept ready, hanging over the stern) would be lowered into the water, a 28-pound lead attached to the rope 5 to 8 fathoms from the dredge; this is to ensure the dredge passing over or along the bottom at the right angle. If the ship is just moving through the water, so much the better; the dredge then goes out clear. I think about one mile an hour not too fast for the dredge to pass along the bottom, and half an hour generally long enough for it to remain down.

On its being brought up, a boy, whom I had shown how to sift the contents, immediately commenced operations, using three diffe-

<sup>1</sup> To complete the account of the *Podophthalmia* collected by Capt. St. John, I subjoin the following description of a Stomatopod crustacean without definite locality, which, being represented only by a single specimen in mutilated condition, I cannot determine with certainty. It is apparently allied to *Cyrtopia*, Dana. The carapace, which loosely covers the body, is attached only near its anterior margin, and is deeply excavated posteriorly on the dorsal surface, leaving three or four segments of the cephalothorax exposed. Anteriorly, it is prolonged forwards between and half conceals the eyes, and is armed with a strong median and two small lateral frontal spines; beneath the eyes there are two small spines on the lateral margins, and one on the postero-lateral lobe on either side of the median excavation. The surface of the carapace is covered with small scattered granules. The postabdominal segments are nearly smooth; the sixth has two teeth on its lateral margins. The terminal segment is entire, tapers slightly to its distal extremity, which is subtruncate and armed with two strong stiff setae. The eyes are large, red, and only slightly project from beneath the margins of the carapace. The antennules have the peduncle thickened, and are furnished with two flagella, which are broken; but the outer in its imperfect state is nearly as long as the animal. The antennae are furnished at base with an ovate leaf-like scale, and have each a single flagellum (unfortunately broken). The cephalothoracic legs are in very imperfect condition; but there seem to have existed six pairs, furnished (at least the anterior pair) with a palp and a branchial leaflet at base. The first five postabdominal segments are furnished with swimming-appendages; the appendages of the sixth segment have subequal rami, ciliated along their inner margins, the outer ovate-lanceolate, and the inner lanceolate and acute. Length about 9 lines ( $\frac{3}{4}$  inch).

rent-sized sieves for the purpose, and placing every thing he found in a wooden tub filled with clean salt water. From this receptacle I always took the specimens myself, putting them at once into bottles with spirit. In working the contents of the dredge, care should be taken that the hand is not used to rub or force them through the sieves. The sieves ought to be shaken backwards and forwards in a tub of water; the sand or mud will quickly pass away, leaving all but microscopic life behind.

I usually kept a small canvas bag of the contents of the dredge previous to its being examined and just as it came up. If hung up, the contents of the bag soon harden and dry; it takes little room, and frequently contains interesting subjects for microscopic examination.

Generally quantities of animal life came up attached to the bag, outside as well as in. It is always well to examine the bag closely immediately the dredge reaches the surface. The small colourless and otherwise difficult-to-distinguish forms which abound in about 50 fathoms will then be more easily found by their movements, whereas if left to die, which they very soon do, they are far more difficult to find.

As the depth of water increases, so ought the distance of the 28-pound lead from the dredge, so as to ensure the lips of the dredge taking the bottom at a proper angle. I used a  $2\frac{1}{2}$ -inch rope next the dredge, increasing that size at 200 fathoms to 3 inches.

The dredge was about 3 feet long by 18 inches wide. This size I found most convenient, the bag being about 3 feet 6 inches deep, and made of ordinary bread-bag stuff, with a good strong network bag outside to protect the inner or real bag from being torn or injured on the hard bottom.

During the seven years I spent in Japan most of the time was on the south coast, where, in consequence, the chief part of the dredgings were obtained. In 1871, however, I had an opportunity of dipping into the cold stream from the north, as it flowed past the north and north-east coast of Yedo. The temperature of this stream was  $36^{\circ}$  to  $39^{\circ}$  F. in the month of August, whereas that of the Kuro Siuvo or equatorial current, a small portion of which enters the Sea of Japan by the Korean Strait and passes out to the Pacific by the Tsuga Strait, was  $58^{\circ}$  to  $60^{\circ}$  at the same time, and in close proximity to the counterstream. These two currents rub together, but do not mix.

From the cold waters the most interesting things were obtained; and I feel sure there is much to be done in this particular portion of the globe, which may be termed the north-west corner of the Pacific.

When practicable, I always took the temperature at the bottom as well as at the surface.

## EXPLANATION OF THE PLATES.

## PLATE I.

Fig. 1. *Pleistacantha sancti-johannis* (p. 24), male individual, natural size.

- 1 a. Inferior view of buccal, orbital, and antennal region of the same.  $\times 3$  diameters.
- 1 b. Lateral view of rostrum.  $\times 3$  diameters.
- 1 c. Outer view of hand of the same.  $\times 3$  diameters.
- 1 d. Postabdomen of the same.  $\times 3$  diameters.
2. *Hyastenus (Chorilia) japonicus* (p. 27), male individual, dorsal view, natural size.
- 2 a. Orbital and antennal region of the same.  $\times 2$  diameters.
- 2 b. Postabdomen of the same.  $\times 2$  diameters.

## PLATE II.

Fig. 1. *Docea orientalis* (p. 28), female individual, natural size.

- 1 a. Inferior view of orbital and antennal region of the same.  $\times 3$  diameters.
2. *Heteroplax ? nitidus* (p. 39), female individual.  $\times 2$  diameters.
- 2 a. Inferior view of frontal, orbital, and antennal region of the same, further magnified.
- 2 b. Outer view of hand of the same.  $\times 4$  diameters.
3. *Heterograpsus longitarsis* (p. 37), male individual, natural size.
- 3 a. Outer view of hand of the same.  $\times 3$  diameters.
4. *Pseudophilyra tridentata* (p. 41), male individual.  $\times 3$  diameters.
- 4 a. Outer view of hand of the same.  $\times 2$  diameters.
5. *Cryptocnemus pentagonus*, Stimpson (p. 43), carapace of male individual.  $\times 3$  diameters.
6. *Paratymolus pubescens* (p. 45), female individual.  $\times 3$  diameters.
- 6 a. Inferior view of buccal, antennal, and orbital region of the same.  $\times 8$  diameters.
- 6 b. Lateral view of carapace of the same.  $\times 3$  diameters.

## PLATE III.

Fig. 1. *Eupagurus cavimanus* (p. 48), male individual.  $\times 1\frac{1}{2}$  diameter.

2. *Pomatocheles jeffreysii* (p. 49), male individual, dorsal view.  $\times 4$  diameters.
- 2 a. Lateral view of the same.  $\times 4$  diameters.
- 2 b. Fourth cephalothoracic leg of the same, greatly magnified.
- 2 c. Fifth cephalothoracic leg, greatly magnified.
- 2 d. Terminal segment and uropoda, greatly magnified.
3. *Heterocuma sarsi* (p. 58), male individual.  $\times 3$  diameters.
- 3 a. Front of cephalothorax, dorsal view, further magnified.
- 3 b. Second maxilliped, greatly magnified.
- 3 c. Third maxilliped of the same, greatly magnified.
- 3 d. Leg of the first pair, greatly magnified.
- 3 e. Terminal segment and uropoda, greatly magnified.

4. A few Remarks on Mr. Elliot's paper "On the Fruit-Pigeons of the Genus *Ptilopus*." By T. SALVADORI, C.M.Z.S.

[Received November 23, 1878.]

My friend Mr. Elliot, in his paper "On the Fruit-Pigeons of the Genus *Ptilopus*" (P. Z. S. 1878, pp. 500, 525) has requested that his conclusions should not be rejected or condemned until after the examination of materials at least approximating somewhat to that which he has consulted. I hope that he will allow that as regards Moluc-

can and Papuan species I have seen a good deal more than he has, and that I am not liable to the reproach of the Greek sculptor to the cobbler of Athens, "*Ne sutor ultra crepidam.*" Just for this reason I shall confine myself to some remarks on the Papuan and Moluccan species, leaving to somebody else to test Mr. Elliot's conclusions as to the species from other localities.

I shall follow Mr. Elliot's order.

#### 18. PTILOPUS XANTHOGASTER.

I do not find among the synonyms the following:—*Ptilopus auranthiventris*, Rosenb. Tijdschr. Ned. Ind. xxix. p. 144 (1867); id. Reis. naar Zuidoostereil. pp. 81, 86 (1867).

The specimens from Lettie Island are smaller, with the head and the neck of a darker and less pure ashy white. Those from Khoor are larger, with the neck whiter.

In the British Museum I examined a specimen marked Marianne Islands (!), smaller, but otherwise not different from those of the Ké Islands.

#### 21. PTILOPUS SUPERBUS.

I have examined the type of *Lamprotreron porphyrostictus*, Gould; and there is not the least doubt that it is a female of this species.

As to the *habitat* of this species and of many others, I must make the remark that it is a pity Mr. Elliot has not mentioned the islands by groups; by mixing together Moluccan and Papuan islands he makes it very difficult to the reader to form a clear idea of the distribution of the species.

This bird has been found not only in the northern part of New Guinea, but also in the southern, on the Fly River and in Yule Island (*D'Albertis*).

#### 22. PTILOPUS TEMMINCKI.

I did not made the mistake of calling this species *Megaloprepia formosa*. My *Megaloprepia formosa* (Ann. Mus. Civ. Gen. ix. p. 122) (1876) is the bird which Mr. Elliot calls *Ptilopus bernsteini*. Mr. Elliot might have perceived which was my bird from its *habitat*; and besides he knew very well that I was well acquainted with *P. temmincki*, as I suggested to him that this was the proper name for *Ptilopus formosus*, Gray.

#### 24. PTILOPUS CORONULATUS.

The following important quotation is missing:—

*Ptilonopus pulchellus*, Wall. (nec Temm.), Ann. & Mag. Nat. Hist. (2) xx. p. 476 (1857), Aru.

This species is confined to the Aru Islands and to the southern part of New Guinea; the localities Salwatty and Sorong, and that of Jobie are wrong, and belong respectively to *P. trigeminus* and *P. geminus*. Ansus is not a distinct island, but a locality in the island of Jobie.

26. *PTILOPUS TRIGEMINUS*.

I question whether Mr. Elliot, who says that it may well be doubted if *P. trigeminus* should be separated from *P. geminus*, has ever seen a specimen of *P. trigeminus*. He says that the only difference is in the slightly paler crown. The case is quite the contrary. I have seen one specimen in the British Museum (Wallace's collection), most likely from Sorong, a second from Salwatty in Gould's collection, and many in the Museum of Leiden. They differ from *P. geminus* in the *brighter crown*, in the paler throat, in the saffron-colour round the violet spot of the abdomen being much reduced, and in the yellow of the lower part of the abdomen being less extended. In fact, as regards the pale violet crown, *P. trigeminus* is intermediate between *P. coronulatus* with a *bright violet crown*, and *P. geminus* with a pinkish, nearly white crown.

27. *PTILOPUS IOZONUS*.

The *habitat* of this species is the Aru Islands and *south* of New Guinea.

29. *PTILOPUS JOBIENSIS*.

The synonymy given is not exact; Mr. Rowley and I used the binomial name, and not a trinomial name like Schlegel.

This species, rather than approaching *P. humeralis*, is allied to *P. iozonus*, of which it is the northern representative. *P. humeralis* differs from both in the deep purple band on the small wing-coverts, whereas these both in *P. jobiensis* and *P. iozonus* are grey-violet; *P. jobiensis* differs from *P. iozonus* in having the tail above uniform green; in *P. iozonus* the tail has a very conspicuous apical grey band.

*P. jobiensis* lately has been found also in Tarawai or D'Urville Island (Atti R. Ac. Sc. Tor. xiii. p. 321).

31. *PTILOPUS NANUS*.

This species has been obtained by D'Albertis on the Fly River (Ann. Mus. Civ. Gen. ix. p. 43); and I think that it is confined to the south of New Guinea and Mysol.

32. *PTILOPUS MONACHUS*.

Mr. Elliot says that the birds from Ternate differ from those of Gilolo, and that the Gilolo bird may require separation. Mr. Gray in his 'Hand-list' had already mentioned that the specimens from Gilolo belong to a variety. I may say that I have seen many specimens from both localities, and that I have not been able to detect any real difference.

34. *PTILOPUS MELANOCEPHALUS*.

The locality Sula-bessie does not belong to this form, but to *P. chrysorrhous*.

I cannot offer any additional remark on the specimens from Flores (*P. melanauchen*, Salvad.); but I think that they belong to a form equivalent to *P. melanocephalus*, *P. melanospilus*, and *P. chrysorrhous*.

38. *PTILOPUS PORPHYREUS*.

This is not a Moluccan nor a Papuan species; still I may mention that, to avoid the confusion with *Columba porphyracea*, Temm. (1822), it would be better to call it *P. roseicollis*, Wagl. Besides Java it inhabits also Sumatra, as has been stated by Bonaparte. I have seen many skins from Sumatra, collected by Dr. Beccari.

42. *PTILOPUS ORNATUS*.

The authority of Laglaize for this species being found on Mount Arfak is not correct, as Mr. Laglaize was never there. Mr. Laglaize's specimens, which I have seen, are from Amberbaki, a locality far away from Mount Arfak.

44. *PTILOPUS PERLATUS*.

The locality Aru Islands does not belong to this species, but to *P. zonurus*. The two are representative forms, one living in Northern New Guinea, Jobie, and Salwatty, and the other in the Aru Islands and in the south of New Guinea, on the Fly River, where D'Alber-tis has lately collected several specimens entirely agreeing with those from the Aru Islands.

45. *PTILOPUS ZONURUS*.

Mr. Elliot could have added many quotations to the synonymy of this species; all the references to *P. perlatus* from the Aru Islands belong to it.

Beside the type, I have seen many specimens of this form from the Aru Islands and from the Fly River; and all of them show the grey band at the tip of the upper surface of the tail. *P. zonurus* has in that respect the same relation to *P. perlatus* that *P. iozonus* has to *P. jobiensis*. It is important to notice that *P. perlatus* and *P. jobiensis* are respectively the northern representative forms of *P. zonurus* and *P. iozonus*. Mr. Elliot's statement that *P. zonurus* is barely distinguishable from *P. perlatus* is rather inconsistent, after he has accepted as distinct *P. jobiensis* and *P. iozonus*, which differ exactly in the same particulars as *P. zonurus* from *P. perlatus*.

47. *PTILOPUS PECTORALIS*.

The synonymy of this species is not correct. Instead of *Columba virens*, Less. Voy. Coq. descr. ♀ [*sic*], it ought to be *Columba cyanovirens*, Less. Voy. Coq. Zool. i. 2, p. 713 (1828). The name of *C. cyanovirens* was given to the female of *P. superbus* and to the present species! It is important to notice the mistake, as, if Lesson had really named this species *C. virens*, this name would have had priority over that of *C. pectoralis*, Wagl. Isis, 1829, p. 739. From the localities Mr. Elliot has left out Koffiao (*Beccari*).

48. *PTILOPUS VIRIDIS*.

S. Müller and many others after him have said that this species is also found in New Guinea, near Lobo. But this is a mistake which has arisen from S. Müller having (Verh. Land- en Volkenk. p. 22) given the name of *Columba viridis* to a young specimen of *P. pectoralis*.



49. *PTILOPUS GEELVINKIANUS*.

I do not think that the name used by Mr. Elliot is the proper one. The exact and full synonymy of this species stands as follows:—

*Ptilopus viridis*, stirps *geelvinkiana*, Schleg. N. T. D. iv. p. 23 (1871).

*Ptilopus musschenbroeki*, Rosenb. in litt. (Schlegel, l. c.).

*Ptilopus viridis geelvinkianus*, Schleg. Mus. P. B. *Columbæ*, p. 23 (1823).

*Ptilonopus musschenbroeki*, Beccari, Ann. Mus. Civ. Gen. vii. p. 715 (1875).

*Ptilopus musschenbroeki*, Salvad. Ann. Mus. Civ. Gen. ix. p. 195, sp. 3 (1876); Rowley, Orn. Miscell. iii. pl. (1878).

*Ptilopus geelvinkianus*, Elliot, P. Z. S. 1878, p. 560, p. 49.

From the above synonymy it appears that the first name given to this species by Prof. Schlegel can not be used, being a trinomial one; and as at the same time he published that of *P. musschenbroeki*, Rosenb., this is the one which Mr. Elliot ought to have used, instead of making a binomial one of his own.

51. *PTILOPUS RIVOLII*.

I also have examined the type of *P. solomonensis*, Gray, and quite agree with Mr. Elliot in referring it to *P. rivolii* ♀. If I remember rightly, I wrote on the label of the typical specimen that such was my opinion.

52. *PTILOPUS PRASINORRHOUS*.

To the localities registered by Mr. Elliot must be added the following, already mentioned by me—Gagie, Guebeh, Dammar, Mafor.

As to *P. prasinorrhous* being different from *P. rivolii*, I do not think there can be the least doubt, although some specimens have the under tail-coverts more or less yellow, and even entirely yellow, but of much paler hue than in *P. rivolii*.

53. *PTILOPUS STROPHIUM*.

Mr. Elliot unites *P. miqueli*, Rosenb., with *P. strophium*, Gould. The latter is based on a specimen, collected by Macgillivray during the voyage of the 'Rattlesnake' in Duchateau Island, one of the Louisiade group, beyond the south-eastern extremity of New Guinea. *P. miqueli* is founded on specimens from Jobie and the small island of Miosnom, very near the west coast of Jobie, in Geelvink Bay. In Miosnom *P. miqueli* is very common; Dr. Beccari has collected many specimens there. In no other place intermediate to those mentioned have *P. strophium* or *P. miqueli* been found. That in such far-away and limited localities the same bird should be found, and not in the very wide intervening tract, is a thing which very few will be disposed to believe; and, besides, the two birds are, according to my views, really different. When I was in London last year I took with me two specimens of *P. miqueli* to compare with the type of *P. strophium*, and found that the latter differs in having the anterior

half of the crown rosy red, the green feathers of the upper parts dusty greyish, as if they were powdered, and the under tail-coverts of a light yellow. *P. miqueli* has the anterior part of the crown purplish red, the feathers of the upper parts of a pure, not dusty-greyish green, and the under tail-coverts of a brighter yellow. Mr. Elliot believes that the type specimen of *P. strophium* is faded upon the forehead; but he has overlooked that the figure of the same, published in Jardine's 'Contributions to Ornithology' when the bird was newly brought to London, shows the same rosy colour of the crown as it now has after twenty-eight years.

The second specimen named *P. strophium* in the British Museum, which was bought from M. Verreaux, without any locality, has the forehead purplish red, and certainly belongs to *P. miqueli*.

#### 54. PTILOPUS BELLUS.

Although this species has the pectoral band yellow and white, like *P. speciosus*, I do not think that this is its *nearest ally*, but rather *P. prasinorrhous*, in which sometimes the white pectoral band is more or less tinged with light yellow. Besides that, *P. speciosus*, unlike any other species, instead of having the crown purple, has only two purple spots in front of the eyes, and the abdomen of a beautiful lilac.

#### 56. PTILOPUS JOHANNIS.

Certainly this bird has its nearest ally in *P. speciosus*, having the abdomen lilac; but, unlike any other species, it has the breast-band all yellow, and the top of the head lilac like the abdomen.

#### 59. PTILOPUS PUELLA.

#### 70. PTILOPUS ASSIMILIS.

#### 71. PTILOPUS MAGNIFICUS.

I must state that, notwithstanding the contrary opinion of Mr. Elliot, I think that these species, and a fourth lately discriminated by me, should be referred to a distinct genus from *Ptilopus*, i. e. to *Megaloprepia*, Rehb., the type of which is *Columba magnifica*, Temm.

If Reichenbach included in the same genus *Ptilopus perlatus*, Temm., which certainly does not belong to it, that is not a good reason for completely discarding the genus, which, according to me, is perfectly recognizable by the rather long tail of the birds, the uniform colour of the same, the first primary not attenuated, and the peculiar colouring of the different members. It is not by taking these characters separately, but combined as they are, that the generic value of the group appears evident.

Then Mr. Elliot seriously questions if the three races mentioned should be continued as distinct species. To maintain this he begins by saying that "they only differ in size," which is not exact; and the proof of this we have from Mr. Elliot himself, who a few lines below says:—"The specimens of the smallest race, called *P. puella*, which are found in the island of Jobie and also at Mount Epa, in the south of New Guinea, have the under surface of the tail lighter

in colour than those from other localities, being blackish-grey, instead of blackish-brown." But Mr. Elliot disposes very easily of this difference, saying, "this, however, cannot be considered of any specific importance." But the truth is, that, guided by the black colour of the under surface of the tail, any one can pick up a true *Megaloprepia puella* among hundreds of the other forms.

Mr. Elliot, as the *habitat* of *P. puella*, besides Mysol, Salwatty, Waigiou, Ghemien, and Dorey, enumerates also Cape York, Jobie, and New Ireland, which are wrong or doubtful. As to Cape York, this locality is given on the authority of Mr. Ramsay; but I doubt whether Mr. Ramsay has ever had the opportunity of comparing a specimen from the northern peninsula of New Guinea with the supposed *M. puella* from Cape York; and I even doubt whether Mr. Ramsay is acquainted with the difference in the under surface of the tail between the true *M. puella* and *M. assimilis*. Even Mr. Elliot did not know the difference, as he asked me how I could distinguish *M. puella* from *M. assimilis* except by size! Most likely Mr. Ramsay's *M. puella* is a small, not full-grown *M. assimilis*. The fact to be shown is that the form with the under surface of the tail *black* lives at Cape York. For my own part, I am not disposed to believe it without additional proofs, as all such birds I have seen (and many they are) were from the northern peninsula of New Guinea, from Waigiou, Ghemien, Salwatty, and Batanta. All the birds from Jobi and the south of New Guinea (Mount Epa and Fly River) have the under face of the tail dark greyish; and these I have lately named *Megaloprepia poliura*, which would be the eastern and southern form representative of *M. puella*. There is an apparently strong objection against this view. A specimen in the Museum of Paris, marked New Ireland, which I have also seen, has the under surface of the tail black. But are we sure that the locality is exact? The bird was collected by Lesson and Garnot during the voyage of the 'Coquille;' and it would not be the first instance of a wrong locality given to a bird collected by them.

In a recent paper, where I have described *M. poliura*, I have given what I think satisfactory characters for discriminating the four forms allied to *M. magnifica*; the principal differences can be tabulated as follows:—

- |   |                          |
|---|--------------------------|
| 1. Cauda inferne grisea.  |                          |
| a. Major: long. tot. circa 0 <sup>m</sup> ·420–0 <sup>m</sup> ·400, al. 0 <sup>m</sup> ·240–0 <sup>m</sup> ·220 ..... | 1. <i>M. magnifica</i> . |
| b. Media: long. tot. circa 0 <sup>m</sup> ·360, al. 0 <sup>m</sup> ·190 .....   | 2. <i>M. assimilis</i> . |
| c. Minor: long. tot. circa 0 <sup>m</sup> ·330, al. 0 <sup>m</sup> ·175–0 <sup>m</sup> ·170 .....                     | 3. <i>M. poliura</i> .   |
| 2. Cauda inferne nigra: long. tot. 0 <sup>m</sup> ·330, al. 0 <sup>m</sup> ·170 .....                                 | 4. <i>M. puella</i> .    |

The four forms mentioned above occupy different areas:—

*Megaloprepia puella* inhabits the northern peninsula of New Guinea, with the islands of Waigheu, Guebeh, Batanta, Salwatty, and Mysol.

*M. poliura* has been found hitherto only in the island of Jobie and in the south of New Guinea (Hall Bay and Fly River).

*M. assimilis* inhabits Cape York, and according to Mr. Ramsay also Rockingham Bay, where, always according to the same Mr. Ramsay it meets

*M. magnifica*, which is generally known to inhabit South Australia and the river Hunter to Moreton Bay.

Turin, Zoolog. Museum, Nov. 19, 1878.

5. Contributions to the Ornithology of the Philippines.—

No. XII. On the Collection made by Mr. A. H. Everett in the island of Basilan. By ARTHUR, Marquis of TWEEDDALE, F.R.S., President of the Society.

[Received November 26, 1878.]

In the year 1876, the island of Basilan was for the first time visited by an ornithological collector, Dr. Steere, who, during the fortnight he resided at the Spanish settlement of Isabella, obtained examples of 23 species of birds. Mr. Everett reached the same island in the month of May of the present year, and remained there during June. Of the collection of birds he formed it is now proposed to give an account.

In all Mr. Everett obtained representatives of 56 species. Of these 12 only have already been enumerated by Mr. Sharpe; so that through Mr. Everett's exertions I am enabled to increase the number of known Basilan birds by 48. To the 56 species collected by Mr. Everett must be added the 11 obtained over and above by Dr. Steere; and the known total of Basilan birds will thus be found to be 67.

By the discovery of *Totanus calidris* in Basilan, Mr. Everett has established one certain Philippine habitat for a species hitherto but doubtfully known to inhabit the archipelago. So now only 28 species are left, the occurrence of which in the Philippines still remains somewhat uncertain.

Mr. Everett writes, that he finds the "wet season at its height, and the rain has been incessant. The hostility of the natives renders it impossible to go beyond a radius of four or five miles from the village without a well-armed party. Hence the collection is rather meagre. Apart from these causes, however, the collection is likely to prove disappointing; for the avifauna of the island does not seem to offer any very marked features to distinguish it from that of the Zamboanga peninsula."

1. PRIONITURUS DISCURUS (2).

[Basilan, ♂ ♀, May, June.]

2. TANYGNATHUS LUCONENSIS (3).

[Basilan, ♂, May.]

3. LORICULUS HARTLAUBI (7).

[Basilan, ♂, May.]

## 4. SPILORNIS HOLOSPIIUS (16)

[Basilan, ♀, June.]

## 5. ELANUS HYPOLEUCUS (18).

[Basilan, ♀, June.]

Not quite mature.

## 6. NINOX SPILOCEPHALA.

*Ninox spilocephala*, Tweeddale, P. Z. S. 1878, p. 939.

[Basilan, ♂ ♀, May, June.]

## 7. SCOPS EVERETTI.

*Scops everetti*, Tweeddale, P. Z. S. 1878, p. 942.

[Basilan, ♂, May.]

## 8. THRIPONAX JAVENSIS (28).

[Basilan, ♀, May: iris orange-yellow. ♀ juv., May: iris white.]

## 9. YUNGIPICUS VALIDIROSTRIS.

*Yungipicus validirostris* (Blyth), Tweeddale, P. Z. S. 1878, p. 943.

[Basilan, ♂, May: iris crimson.]

Basilan examples agree with those from Zamboanga. The description given by Cabanis (Mus. Hein. iv. pt. ii. p. 60), under the above title, of a Philippine member of the genus agrees best with the Luzon bird.

## 10. EURYSTOMUS ORIENTALIS (37).

[Basilan, ♀, May.]

## 11. PELARGOPSIS GIGANTEA.

*Pelargopsis gigantea*, Walden, Ann. & Mag. Nat. Hist. ser. 4, xiii. p. 123.

[Basilan, ♀, May: coloration of soft parts identical with that in *P. leucocephala*.]

## 12. SAUROPATIS CHLORIS (47).

[Basilan, ♀, May.]

## 13. CAPRIMULGUS MANILLENSIS (55).

[Basilan, ♂ ♀, May and June.]

## 14. CACOMANTIS MERULINUS (57).

[Basilan, ♂ ♀, May.]

The male is in mature plumage, the female in rufous dress.

## 15. SURNICULUS VELUTINUS.

*Surniculus velutinus*, Sharpe, Tr. L. S. ser. 2, Zool. i. p. 320.

[Basilan, sex?, May: iris dark brown; bill black; feet grey; soles ochreous.]

## 16. EUDYNAMIS MINDANENSIS (61).

[Basilan, ♀, May.]

## 17. PYRRHOCENTOR MELANOPS (65).

[Basilan, ♂, May.]

## 18. BUCEROS MINDANENSIS.

*Buceros mindanensis*, Tweeddale, P. Z. S. 1877, p. 543.

[Basilan, ♂ ♀, May.]

## 19. PENELOPIDES AFFINIS.

*Penelopides affinis*, Tweeddale, P. Z. S. 1877, p. 824.

[Basilan, ♂ ♀, June.]

## 20. ARTAMUS LEUCORHYNCHUS (73).

[Basilan, ♂ ♀, May.]

## 21. GRAUCALUS STRIATUS (74).

[Basilan, ♀: iris pale lemon-yellow.]

## 22. LALAGE DOMINICA (76).

[Basilan, ♂ ♀, May.]

## 23. DICRURUS STRIATUS.

*Dicrurus striatus*, Tweeddale, P. Z. S. 1877, p. 545, no. 20.

[Basilan, ♂, June; ♀, May.]

## 24. LEUCOCERCA NIGRITORQUIS (83).

[Basilan, ♀, June.]

## 25. HYPOTHYMIS AZUREA (85).

[Basilan, ♂, May and June.]

## 26. HYPOTHYMIS SUPERCILIARIS.

*Hypothymis superciliaris*, Sharpe, Tr. L. S. ser. 2, Zool. i. p. 326, no. 53.

[Basilan, ♀, June: iris dark brown; bill black; legs dark brown.]

## 27. SETARIA RUFICAUDA.

*Setaria ruficauda*, Sharpe, Tr. L. S. ser. 2, Zool. i. p. 327.

[Basilan.]

Identified by Mr. Sharpe.

## 28. SARCOPHANOPS STEERII.

*Eurylæmus steerii*, Sharpe, Nature, August 1876, p. 297.*Sarcophanops steerii*, id. Tr. L. S. ser. 2, Zool. i. p. 344, no. 115, t. liv. f. 1, 2.

[Basilan, ♀, May: iris fine bluish green.]

With reference to the colour of the iris as stated by Mr. Sharpe

(*l. c.*) on Dr. Steere's authority, Mr. Everett remarks:—"Dr. Steere is in error in saying that the iris of *Sarcophanops* is like 'a clear crystal, crowded with specks of gold.' The iris is not yellow, but rich mineral green, and precisely resembles the iris of *Cymborhynchus macrorhynchus*. If the describer had said 'a clear crystal of emerald, crowded with specks of gold,' the peculiar grained appearance of the eye and its colour would have been correctly indicated."

The series sent by Mr. Everett corroborates Mr. Sharpe's statement (*l. c.*) that the females are distinguished from the males by having the breast pure white and not vinaceous. In Mr. Sharpe's plate of the species, the male bird is marked with the feminine symbol, and the female with the masculine. The Dinagat bird in no respect differs from these typical specimens.

29. *BRODERIPUS ACORRHYNCHUS* (90).

[Basilan, ♀, May.]

30. *ORIOLUS STEERII*.

*Oriolus steerii*, Sharpe, Cat. B. in Mus. Brit. iii. p. 213, t. x; Tr. L. S. ser. 2, Zool. i. p. 329.

[Basilan, ♂, May: iris carmine; bill burnt sienna-brown; legs dark grey.]

The series sent by Mr. Everett enables me to compare *O. steerii* with its representative form *O. assimilis*, ex Zebu, and to confirm the absolute distinctness of the two species.

31. *ERYTHROPITTA ERYTHROGASTRA* (94).

[Basilan, sex ?, May.]

Examples of an apparently immature female.

32. *MEGALURUS RUFICEPS*.

*Megalurus ruficeps*, Tweeddale, P. Z. S. 1877, p. 695, no. 41, t. lxxii.

[Basilan, ♂, June.]

33. *MIXORNIS CAPITALIS*.

*Mixornis capitalis*, Tweeddale, P. Z. S. 1878, p. 110, pl. vii. f. 2.

[Basilan, ♂, June: iris orange; bill blackish; legs light olive-green.]

34. *IRENA MELANOCHLAMYS*.

*Irena melanochlamys*, Sharpe, Tr. L. S. ser. 2. Zool. i. p. 334, no. 75.

[Basilan, ♂, June: iris pure Indian-red. ♀, May: iris pure Indian-red; bill and legs jet-black.]

A representative form of *I. cyanogastra*, from which it appears only to differ by having the scapulars and interscapular region black, without any tint of purplish blue.

35. *IXUS GOLAVIER* (99).

[Basilan, ♀, June.]

36. *HYPSIPETES RUFIGULARIS*.*Hypsipetes rufigularis*, Sharpe, Tr. L. S. ser. 2, Zool. i. p. 335.

[Basilan, ♂, May, June.]

37. *COPSYCHUS MINDANENSIS* (106).

[Basilan, ♂ ♀, May and June.]

38. *ORTHOTOMUS FRONTALIS*.*Orthotomus frontalis*, Sharpe, Ibis, 1877, p. 112, t. ii. f. 1.

[Basilan, ♀, May: iris clay-colour; maxilla brown; mandible pale whitish; legs pale clear brown.]

The amount of rufous on the head of this species varies considerably in different individuals. In some it occupies the whole forehead and extends back to the vertex, and also colours the ear-coverts and a broad space below the eyes.

39. *DICAËUM HYPOLEUCUM*.*Dicaeum hypoleucum*, Sharpe, Nature, August 1876, p. 298; id. Tr. L. S. ser. 2, Zool. i. p. 339, no. 96.

[Basilan, ♂, May: iris bright warm brown; bill black; legs dark grey.]

40. *CYRTOSTOMUS JUGULARIS* (123).

[Basilan, ♂ ♀, May and June.]

One of the four adult males sent by Mr. Everett has a distinct broad metallic blue frontal patch.

41. *ANTHOTHREPTUS CHLOROGASTER*.*Anthreptes chlorigaster*, Sharpe, Tr. L. S. ser. 2, Zool. i. p. 342, no. 107.

[Basilan, ♀, June.]

I thus identify a single example of the female; but specimens of the male have to be examined before the identity of the species can with certainty be determined.

42. *CORVUS PHILIPPINUS* (125).

[Basilan, ♂ juv., May.]

Basal portion of body-plumage grey.

43. *CALORNIS PANAYENSIS* (128).

[Basilan, ♀, May.]

44. *SARCOPS CALVUS* (129).

[Basilan, ♂ ♀, June.]

One example (♂) with interscapular region brown, the others with that part hoary-grey.



## 45. OSMOTRERON VERNANS (135).

[Basilan, ♀, May.]

## 46. PTILOPUS MELANOCEPHALUS.

*Ptilopus melanocephalus* (Forster); Tweeddale, P. Z. S. 1878, p. 951.

[Basilan, ♂ ♀, May, June.]

Not to be distinguished from Zamboanga examples.

## 47. RAMPHICULUS OCCIPITALIS (138).

[Basilan, ♀, June: iris light hazel-brown.]

## 48. PHABOTRERON BREVIROSTRIS.

*Phabotreron brevirostris*, Tweeddale, P. Z. S. 1877, p. 549.

[Basilan, ♀, May: iris light warm brown; bill black; feet carmine.]

## 49. CARPOPHAGA AENEAE (141).

[Basilan, ♂ ♀, May.]

## 50. IANTHÆNAS GRISEIGULARIS (145).

[Basilan, ♂ ♀, May and June.]

## 51. MACROPYGIA EURYCERCA.

*Macropygia eurycerca*, Tweeddale, P. Z. S. 1878, p. 288, no. 49.

[Basilan, ♀, May.]

## 52. CHALCOPHAPS INDICA (150).

[Basilan, ♂ ♀, May and June.]

## 53. GALLUS BANKIVA (153).

[Basilan, ♂ ♀, May.]

## 54. MEGAPODIUS DILLWYNI (158).

*Megapodius dillwyni*, Tweeddale, P. Z. S. 1877, p. 766.

[Basilan, ♀, June.]

## 55. TOTANUS CALIDRIS (184).

[Basilan, ♀, May: iris bright brick-red.]

The occurrence of the Redshank in the Philippines is thus established.

## 56. NYCTICORAX MANILLENSIS (198).

[Basilan, ♂, May. Iris golden-yellow; orbital region yellow-green; bill black; basal half of mandible yellow; legs light yellowish; the front of tarsi and the upper surface of feet olivaceous brown.]

6. List of the Mammals, Reptiles, and Batrachians sent by Mr. Everett from the Philippine Islands. By Dr. A. GÜNTHER, F.R.S., F.Z.S., Keeper of the Zoological Department, British Museum.

[Received December 9, 1878.]

(Plate IV.)

Mr. A. Everett has kindly supplied me with the following notes as regards the localities at which the specimens were collected:—

“‘Butuan’ refers to the immediate vicinity of the mouth of the Batuan river; ‘Surigao’ to the immediate vicinity of the town of Surigao; ‘N. Mindanao’ to specimens obtained at one or the other of the two preceding localities, and ‘Dinagat’ to the long mountainous island of this name situated to the north of Surigao and to the eastward of the island of Panaon. It is a curious fact in regard to Dinagat that, whilst it is inhabited by Deer, Wild Pigs, Viverridae, *Galeopithecus*, *Sciurus*, and *Tarsius*, it possesses no Monkeys, though these abound in the Surigao peninsula. I am informed that the same circumstance holds good for the island of Siargao somewhat to the eastward of Dinagat. Placer is in N.E. Mindanao.”

I have considered it useful to add within brackets ([ ]) other localities within the Philippine archipelago, from which specimens in the British Museum have been previously obtained.

### *Mammals.*

*MACACUS PHILIPPINENSIS*, Geoffr.

Surigao and Butuan river.

[Negros, Luzon.]

*GALEOPITHECUS PHILIPPINENSIS*, Waterh.

Surigao and Dinagat Island.

Out of thirteen specimens from the latter locality, two only are of a bright rufous colour, the majority being of a brownish slate-colour, varying into grey or brown, with or without small lighter spots. The majority have a white occipital spot more or less distinct, and a few, in addition, a white streak along the forehead.

The specimen from Surigao has a much denser fur than those from Dinagat Island; its colour is a dark brown, and very glossy.

*PTEROPUS EDULIS*, Geoffr.

Dinagat Island and island of Rasol near Surigao.

*PTEROPUS HYPOMELANUS*, Temm.

Surigao and Dinagat Island.

*PTEROPUS JUBATUS*, Eschsch.

Dinagat Island, S. Leyte, S. Negros.

[Luzon.]

## PHYLLORHINA OBSCURA, Ptrs.

Dinagat Island.

## CROCIDURA LUZONIENSIS, Ptrs.

Cebu.

[Luzon, Manilla.]

"This is the animal which I formerly suspected to be a species of *Spalax*."—A. E.

## FELIS MINUTA, Temm.

Visayan name "Tamaral."

S. Negros.

## PARADOXURUS PHILIPPINENSIS, Temm.

North Mindanao.

[Manilla, Luzon.]

## MACROXUS PHILIPPINENSIS, Waterh.

Placer, N.E. of Mindanao.

## MUS EVERETTI, sp. n.

Upper and lateral parts clothed with rather harsh fur, some of the hairs, especially on the sides, being slender, flattened, and channelled spines. The hairs on the hinder part of the back remarkably long and without channelled spines. Hairs of the lower parts shorter and softer than the others. Ears rather short, rounded and naked. Tail almost naked, the hairs between the verticelli being very short. Thumb of fore foot very short, covered with a large convex nail.

Under-fur grey, the shorter hairs brown, the longer black towards the extremity, or black with brown tips. Lower parts dusky grey; feet blackish; tail blackish, *with the terminal third white*.

The following measurements are taken from the skin:—

	in. lines.
Length of head and body (♂) .....	8 6
" tail .....	7 5
" fore foot .....	1 0
" hind foot .....	1 11
" a long hair on back .....	1 8
" skull .....	2 0
" series of upper molars .....	0 4 $\frac{1}{3}$
" first upper molar .....	0 2
Distance between incisor and first molar ....	0 6 $\frac{2}{3}$

*Tortoise.*

## CUORA AMBOINENSIS, Daud.

Dinagat Island.

[Laguna del Bay.]

*Crocodile.*

## CROCODYLUS PALUSTRIS, Less.

Placer.

*Lizards.*

HYDROSAURUS CUMINGI, Mart.

Placer, Butuan.

HYDROSAURUS NUCHALIS, Gthr.

South Negros.

SENIRA BICOLOR, Gray.

South Negros.

EUPREPES RUFESCENS, Shaw.

South Negros, North Mindanao.

TILQUA MULTICARINATA, Gray.

Dinagat Island.

KENEUXIA SMARAGDINA, Less.

Dinagat Island.

MOCOA CUMINGI, Gray.

Dinagat Island.

OTOSAURUS CUMINGI, Gray.

Dinagat Island.

HINULIA VARIEGATA, Ptrs.

Dinagat Island.

[Mindanao.]

HINULIA ACUTA, Ptrs.

Dinagat Island.

GECKO VERUS, Merr.

South Negros.

GECKO MONARCHUS, D. & B.

Placer, Dinagat Island.

NYCTERIDIUM SCHNEIDERI, Shaw.

Dinagat Island.

CYRTODACTYLUS PHILIPPINICUS, Steind.

Dinagat Island.

LOPHURA AMBOINENSIS, Schloss.

In specimens from Placer the caudal crest terminates behind abruptly, whilst it gradually diminishes in height in specimens from Dinagat, South Negros, and Surigao.

BRONCHOGELA MOLUCCANA, Less.

Dinagat Island.

DRACO ORNATUS, Gray.

Dinagat Island, South Negros.

[Luzon.]

DRACO BIMACULATUS, Gthr.

Dinagat Island.

DRACO CORNUTUS, Gthr.

Placer.

DRACO SPILOPTERUS, Wiegman.

South Negros.

[Luzon.]

*Snakes.*

CALAMARIA GERVAISII, D. & B.

South Negros.

[Luzon.]

RHABDOSOMA MODESTUM, D. & B.

Dinagat Island.

[Luzon.]

#### TYPHLOGEOPHIS, g. n., Calamar.

Body cylindrical; tail short; head of moderate length, depressed, not wider than the neck. Eye externally not visible. Shields of the upper side of the head normal; nasal, loreal, ante- and post-orbitals absent. Scales smooth, in fifteen series; anal entire; sub-caudals paired. Maxillary and palatine teeth equal in length; none grooved.

This remarkable Snake reminds us, by the want of development of the eye and nasal shield, of *Calamaria* (*Typhlocalamus*) *gracillima*, from which it differs in the presence of two frontal shields.

#### TYPHLOGEOPHIS BREVIS, sp. n.

The anterior frontals are rather small, only about one third the size of the posteriors. Vertical small, six-sided, as broad as long, with an obtuse angle in front, and a right angle behind. Occipitals as long as the vertical and frontals together. Four upper labials, of which the two anterior form sutures with the frontals, the third with the supraorbital, and the fourth with the occipital. A large shield in the angle formed by the occipital and last upper labial. Ventrals 154; subcaudals (?).

Uniform brownish, the lateral scales and the ventral scutes with lighter margins.

A single specimen is in the collection; it is 12 inches long, the head measuring  $4\frac{1}{2}$  lines. No label indicating its locality is attached to it; but it comes either from North Mindanao or Dinagat Island. Unfortunately, the extremity of the snout has been allowed to dry and is considerably shrunk; also the tail is somewhat mutilated.

OLIGODON MODESTUS, Gthr.

South Negros.

The supposition that this might be a Ceylonese species proves to be incorrect.

## ODONTOMUS MÜLLERI.

(=*Lycodon mülleri*, D. & B.)

Surigao.

## SPILOTES MELANURUS, Schleg.

South Leyte.

## DENDROPHIS PHILIPPINENSIS, sp. n. (Plate IV.)

This is the Philippine representative of *Dendrophis caudolineata*. Scales in thirteen rows, those of the vertebral series a little larger than the others. Eye of moderate size. Loreal longer than high, and pointed behind. The preorbital does not touch the vertical; occipitals obtuse behind; two postoculars. Temporals 2+2+2, the anterior small, the posterior largest. Ten upper labials, the fourth, fifth, and sixth entering the orbit. Ventrals 167, strongly keeled; anal bifid. Greenish olive, with a straight black band commencing in the loreal region, and running backwards along the upper side of the neck, and disappearing at a shorter or greater distance from the head. A black line along the meeting of the outer series of scales and the subcaudal shields runs to the tip of the tail; sometimes it is accompanied by another black line running above and parallel to it. A black line along the meeting edges of the subcaudals.

A single specimen, 40 inches long, was obtained in N. Mindanao; a second specimen, from Cuming's collection, is in the British Museum.

## TRAGOPS FRASINUS, Reinw.

North Mindanao.

## DIPSAS DENDROPHILA, Reinw.

Butuan.

## DIPSAS CYNODON, Cuv.

North Mindanao.

## HOLOGERRHUM PHILIPPINUM, Gthr.

Placer.

## PSAMMODYNASTES PULVERULENTUS, Boie.

Dinagat Island, Placer.

## LYCODON AULICUS, L.

Butuan.

[Luzon.]

## CERBERUS RHYNCHOPS, Schneid.

Placer.

[Negros.]

## NAJA TRIPUDIANS, L.

North Mindanao, South Leyte.

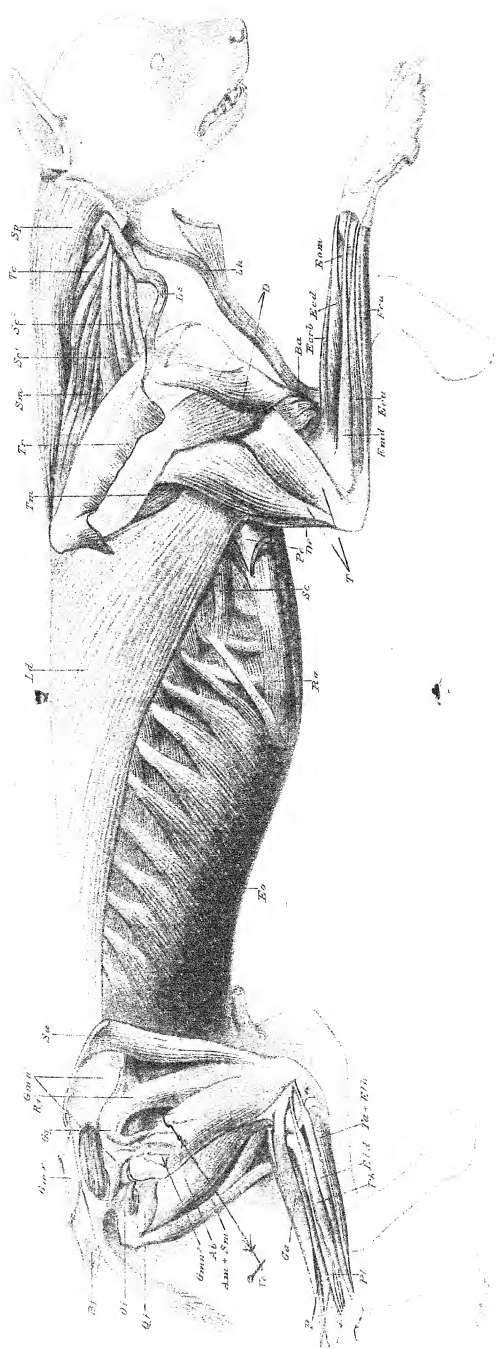
## TRIMERESURUS WAGLERI, Schleg.

Butuan.









ANATOMY OF HYENA CROCUTA



*TRIMERESURUS FLAVOMACULATUS*, Gray.

(= *Megæra ornata*, Gray, = *Megæra variegata*, Gray.)

Placer.

The ground-colour varies; one specimen is purplish brown, with darker cross bars, and with a series of salmon-coloured spots along each side of the belly.

*Frogs.*

*RANA TIGRINA*, Daud.

Surigao.

[Laguna del Bay.]

*RANA MACRODON*, Kuhl.

Dinagat Island.

[Negros, Laguna del Bay.]

*MEGALOPHRYS MONTANA*, Kuhl.

Dinagat Island.

*IXALUS NATATOR*, Gthr.

Dinagat Island.

*POLYPEDATES APPLNDICULATUS*, Gthr.

Dinagat Island.

*RHACOPHORUS PARDALIS*, Gthr.

Dinagat Island.

*PLATYMANTIS MEYERI*, Gthr.

Dinagat Island.

[Laguna del Bay.]

7. On the Anatomy of *Hyæna crocuta* (*H. maculata*). By MORRISON WATSON, M.D., and ALFRED H. YOUNG, M.B., of The Owens College, Manchester. Communicated by A. H. GARROD.

[Received November 15, 1878]

(Plates V., VI.)

The remarkable and unique characters of the generative organs of *Hyæna crocuta*, accounts of which have formed the subject matter of two previous communications to this Society<sup>1</sup>, suggested the advisability of investigating the general anatomical features of this species with a view to future comparison. In the meantime, as nothing like a comprehensive or detailed description of the anatomy of the Spotted Hyæna has hitherto been given, and as that of other members of the same genus is incomplete and exists only in a scattered form, we have thought that the record of our observations on this subject might be of use. That it might prove so we have endeavoured to ensure by making our descriptions as complete as

<sup>1</sup> Watson, Proc. Zool. Soc. May 1877, and April 1878.

possible, supplementing these where it has been deemed expedient by illustrations sketched from recent dissections. Necessarily this course of procedure, especially as applied to the muscles, entails somewhat lengthy accounts. This doubtless, from some points of view, is objectionable; we have preferred to adopt it, however, rather than refer to groups of structures as being "arranged in the usual manner," a system of recording observations which, however satisfactory to the author, frequently renders a paper utterly useless to subsequent workers.

So far as the records of the older writers (notably Herodotus<sup>1</sup>, Aristotle<sup>2</sup>, Pliny<sup>3</sup>, and Ælian<sup>4</sup>) attest, their observations on the genus *Hyæna* are practically limited to a consideration of the external features and sexual peculiarities—a misconception having existed on this latter point, which has extended to the present time.

Beyond this their writings are almost entirely confined to lengthy accounts of the various superstitions respecting the *Hyæna* and certain of its individual parts. Of all these a fair summary is to be found in Topsel's collection from the writings of Gesner and others<sup>5</sup>. Here also the hermaphroditic nature of the species is referred to and denied.

Subsequently to this time, as might naturally be expected in the case of so common and familiar a Carnivore, the detailed anatomy of the genus has received more or less attention at the hands of various observers. Except in so far as the osseous system is concerned, however, it is somewhat astonishing to find that the record of their work which constitutes the modern literature concerning *Hyæna*, refers only (*i. e.* when the species is definitely stated) to *H. striata* or to *H. brunnea*, the Spotted *Hyæna* having apparently thus far enjoyed almost a total immunity from the scalpel.

We would specially indicate here, as embodying the greater part of what is known regarding the soft parts of the former species, that descriptive accounts of the visceral organs have been given by Reimann<sup>6</sup>, Rudolphi, Daubenton<sup>7</sup>, and Hunter<sup>8</sup>, whilst Meckel<sup>9</sup> and Cuvier<sup>10</sup>, who also seem in the main to have limited their observations to this species, refer not only to the viscera, but also to the muscular arrangements, Meckel further making isolated references to the viscera of *H. crocuta*. The muscles of *H. striata* are fully illustrated, in plates 129–142 of Cuvier and Laurillard's 'Myology'<sup>11</sup>. Respecting *H. brunnea*, Dr. Murie<sup>12</sup> has contributed a paper on the viscera and female generative organs, and indicated some of the characteristic myological features of the species.

<sup>1</sup> Rawlinson's Herodotus, vol. iii.

<sup>2</sup> Historia Animalium, vi.

<sup>3</sup> Pliny, viii.

<sup>4</sup> Historia Animalium, i.

<sup>5</sup> The History of Four-footed Beasts and Serpents, collected out of the writings of Conradus Gesner and other writers, by Ed. Topsel, 1658, p. 339.

<sup>6</sup> De Hyæna, Berol. 1811.

<sup>7</sup> Buffon, Histoire Naturelle, tome ix.

<sup>8</sup> Essays and Observations, edit. by Owen, 1861, vol. ii.

<sup>9</sup> Anatomie Comparée.

<sup>10</sup> Leçons d'Anat. Comp.

<sup>11</sup> Recueil de Planches de Myologie.

<sup>12</sup> Trans. Zool. Soc. Lond., vol. vii. p. 503.

The animal from which the following observations have been compiled was a well-developed male. It came into our possession shortly after death, in excellent condition for dissecting-purposes.

## VISCERA.

### *Digestive Organs.*

*Tongue.*—The tongue conforms to the Carnivorous type of the organ, being elongated, flattened, and thin. The filiform papillæ covering the whole of the dorsal surface and margins are of large size, and present the appearance of small recurved spines. One inch behind the tip these papillæ are somewhat modified in form, and are arranged in a clearly defined oval patch. In this region each papilla is situated on a broad conical base, and terminates in a blunt truncated extremity, which contrasts strongly with the sharp recurved appearance of these papillæ upon other parts of the organ. This patch is referred to by Owen<sup>1</sup>, in his description of the tongue in the genus *Hyæna*, but without particularizing the species. Interspersed among the filiform papillæ, over the entire surface of the tongue, and almost concealed by them, are numerous minute fungiform papillæ of a white colour and devoid of spines. The circumvallate papillæ are two in number, of small size. They are situated close to the root of the tongue, one on either side of the middle line. With regard to the number of these structures, our observations agree with those of Meckel<sup>2</sup> and Rudolphi<sup>3</sup>, and differ from those of Daubenton<sup>4</sup>, according to whom they are four in number. As, however, the specimen examined by the latter author belonged to the species *H. striata*, this may account for the difference of statement. Meckel does not particularize the species which he examined, though probably it was *H. striata*. Behind the circumvallate papillæ, those of the filiform variety are of larger size than elsewhere, and differ in being soft and devoid of the spiny character which distinguishes those placed more anteriorly. The tongue of the Spotted Hyæna, both as regards its form and the arrangement of its papillæ, agrees closely with that of *H. striata* and of *Proteles*<sup>5</sup>. In all of these we recognize the patch of truncated filiform papillæ near the tip; at the same time it is to be observed that this is not a distinctive feature in the anatomy of these animals, a somewhat similar appearance being recognizable in the tongues of certain of the true Felidæ. This patch in *Proteles* corresponds to the anterior third of the tongue; but in both *H. crocuta* and *H. striata* it is confined to the central region of the tip, and does not extend to the margins of the organ. In the Civet, the tongue of which in other respects closely resembles that of *Hyæna*, this patch is absent.

The *tousil* is of considerable size, oval in form, and consists of a number of obliquely placed glandular ridges. It closely resembles the

<sup>1</sup> Anatomy of Vertebrates, vol. iii. p. 198.

<sup>2</sup> Anatomie Comparée, vol. viii. p. 635.

<sup>3</sup> Reimann, De Hyæna, Berol. 1811, p. 15.

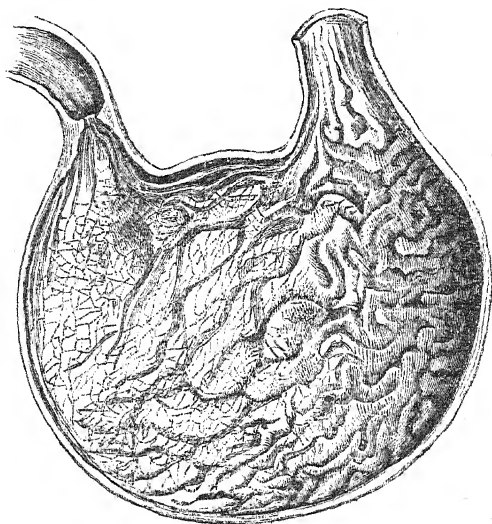
<sup>4</sup> Buffon, Histoire Naturelle, vol. ix. p. 129.

<sup>5</sup> Prof. Flower, Proc. Zool. Soc. 1869, p. 474.

corresponding organ in *Proteles*<sup>1</sup>. The soft palate is short, and presents no trace of uvula, such being the case likewise in *Proteles*. The œsophagus, as noted by Meckel<sup>2</sup> in the specimen examined by him, is wide and dilatable. Its muscular walls are very thick, as is also the mucous coat, the latter being dense, tough, and thrown into longitudinal rugæ.

*Stomach*.—The stomach is short and rounded, and corresponds exactly as regards form with the description given by Daubenton<sup>3</sup> and Murie<sup>4</sup> of that organ in *H. striata*<sup>5</sup> and *H. brunnea* respectively, and by Professor Flower<sup>6</sup> in his observations on *Proteles*. When emptied of its contents, it measures 9 inches in length and 7 inches

Fig. 1.



Stomach of *Hyæna crocuta*, laid open to show character of the mucous membrane.

in greatest breadth. The œsophagus enters the small curvature close to the left extremity; and in consequence the great end or fundus of the stomach is extremely shallow. The greater curvature presents a slight constriction close to the pyloric extremity, similar to that noticed by Prof. Flower in *Proteles*. The walls are thick and muscular, as in *H. brunnea* and *Proteles*. Dr. Murie recognized in the former a central tendon, from which the muscular fibres

<sup>1</sup> Prof. Flower, Proc. Zool. Soc. 1869, p. 474.

<sup>2</sup> *Loc. cit.*

<sup>3</sup> Trans. Zool. Soc. vol. vii. p. 508.

<sup>4</sup> The stomach of *H. striata* is figured in the 'Erläuterungstafeln zur vergleichenden Anatomie' of C. G. Carus.

<sup>5</sup> Proc. Zool. Soc. 1869.

<sup>6</sup> *Loc. cit.*

radiated somewhat after the manner observed in the gizzard of a bird ; and the same appearance is noticeable in our specimen. This tendinous arrangement, however, is confined to the surface of the organ, and does not extend into the wall. Professor Flower, in accordance with differences in appearance of its mucous membrane, describes three distinct portions of the stomach in *Proteles*; and a similar subdivision may be adopted in describing that of *Hyæna crocuta*. In the first, or cardiac portion of the organ, the mucous membrane is thrown into well-marked rugæ, which are not arranged in any regular manner, but, uniting at various points with one another, give rise to a convoluted appearance somewhat resembling the gyri of the cerebrum. They are more irregularly disposed at the entrance of the œsophagus than elsewhere, and are here continuous with the longitudinal rugæ of that tube. In respect of the rugose character of this portion of the gastric mucous membrane, *H. crocuta* differs from *Proteles*, in the stomach of which these rugæ are absent. Corresponding to the middle third of the stomach, the mucous membrane is thrown into rugæ of larger size than elsewhere. These rugæ lie parallel to the long axis of the organ, and are united here and there by means of smaller transverse folds. Along the great curvature the large longitudinal folds are better marked than on the small curvature of the stomach. The mucous membrane of the duodenal third of the stomach is less rugose than that of any other portion, such rugæ as are present being found in relation to the curvatures of the organ, whilst the anterior and posterior walls of the stomach are quite smooth. Every portion of the gastric mucous membrane in the intervals of the larger rugæ presents a delicate reticulate and glandular appearance. The pyloric orifice is extremely small, and in the specimen examined measured only  $\frac{1}{8}$  of an inch in diameter. The valve is annular in form, and not crescentic as in *Proteles*. It will be seen from what has been said, that, in respect of the form and character of the stomach, but little difference is observable between the three species of *Hyæna* when they are compared with one another or with *Proteles*.

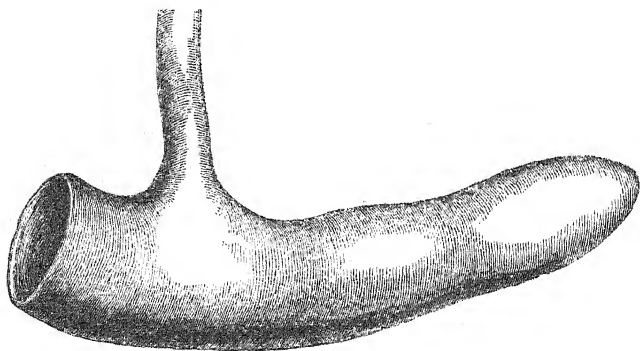
*Small Intestine*.—This portion of the gut measures 32 feet 6 inches in length. Its diameter is not uniform, but presents a number of constrictions, which are distributed at irregular intervals along its entire course. As a rule it measures about one inch in diameter; but where constrictions occur it does not exceed half an inch. Throughout its course its mucous membrane is covered with villi. The Peyerian patches are eight in number, and vary much in size, the smaller being found towards the commencement of the intestine, whilst the largest, which measured 9 inches in length, was situated toward the lower end of the ileum. It is worthy of note that in *Proteles* the number of these patches is the same as in *H. crocuta*. In *H. striata*, according to Meckel<sup>1</sup>, they do not exceed twelve in number.

*Great intestine*.—The cæcum measures 6 inches in length, and agrees closely as regards its form with that figured by Daubenton in *H. striata*. In the latter species, according to the author named,

<sup>1</sup> *Loc. cit.* p. 706.

it measured 9 inches in length—according to Reimann, 6 inches. In *H. brunnea* it is  $8\frac{1}{2}$  inches long, whilst in *Proteles* it is short and globular, measuring only one inch in length. The large intestine exclusive of cæcum measures  $26\frac{1}{2}$  inches, and is provided with thick muscular walls. In *H. striata* the great gut measures 3 feet, and in *H. brunnea* 2 feet 6 inches in length, whilst in *Proteles*, exclusive of the cæcum, it measures 14 inches. In connexion with the lower end of the rectum are two anal glands, which pour their contents into a pouch situated immediately above the anus. These glands, which have been previously described<sup>1</sup>, resemble more closely, both in respect of number and size, the corresponding structures in *Proteles* than those of any other species of *Hyæna*.

Fig. 2.

Cæcum of *Hyæna crocuta*.

The following Table shows the length of the intestines, together with that of the body, in the different species of *Hyæna*; but it is right to state, with reference to the latter measurement of *H. crocuta*, that we have taken it to be the same as in *H. brunnea*, having unfortunately omitted to ascertain the dimensions of the specimen examined; the measurements of the other species are those of Daubenton, Murie, and Flower respectively.

	<i>H. striata</i> . ft. in.	<i>H. brunnea</i> . ft. in.	<i>H. crocuta</i> . ft. in.	<i>Proteles</i> <i>cristatus</i> . ft. in.
Length of body from				
nose to anus . . . .	3 2	3 9	3 9	2 3
Small intestine . . . .	23 0	26 7	32 6	9 6
Great intestine . . . .	3 9	3 $3\frac{1}{2}$	2 8	1 3

From this table it appears that in *H. striata* the length of the whole intestine from pylorus to anus is to that of the body as 8 to 1,

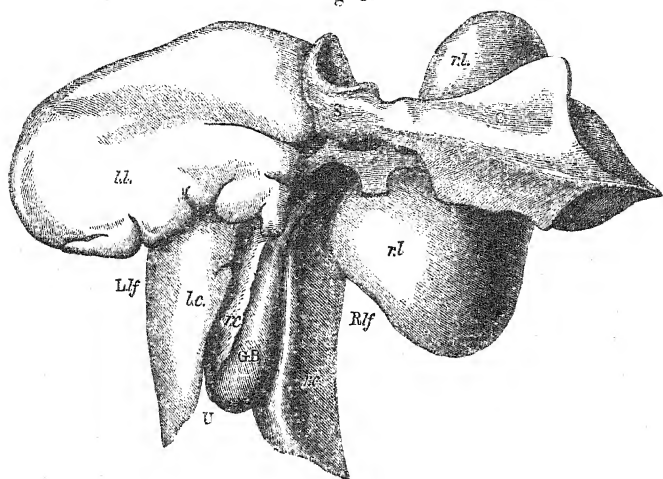
<sup>1</sup> Proc. Zool. Soc. May, 1877.



in *H. brunnea* as 8 to 1, in *Proteles* as 5 to 1, and in *H. crocuta* as more than 9 to 1. With reference to the relative lengths of the small and great intestines, the table shows that in *H. striata* the length of the small intestine is to that of the great as  $6\frac{1}{7}$  to 1, in *H. brunnea* as  $8\frac{1}{5}$  to 1, in *Proteles* as  $7\frac{3}{8}$  to 1, and in *H. crocuta* as  $12\frac{1}{5}$  to 1. *H. crocuta* therefore differs from the other species named in the greater length of the small intestine as compared not only with that of the body, but also with that of the great intestine.

*Liver*.—The liver is large. In accordance with Prof. Flower's<sup>1</sup> method of description, we distinguish two hepatic segments, a right and a left, each of which is divided into lobes. The *left* segment is the smaller, and is divided, by means of a well-marked lateral fissure, into a lateral and a central lobe. Of these the former is much the larger and of an oval form, whilst the latter is triangular, with the apex directed backward. The *right* segment of the liver, larger

Fig. 3.

Liver of *Hyæna crocuta*.

*U*, umbilical fissure; *Llf*, left lateral fissure; *Rlf*, right lateral fissure; *ll*, left lateral, and *lc*, left central lobe; *rl*, right lateral, and *rc*, right central lobe; *S*, Spigelian lobe; *C*, caudate lobe; *G.B.*, gall-bladder.

than the left, also presents a well-marked lateral fissure, by means of which the right central is cut off from the right lateral lobe. On the visceral aspect of the former is a deep cystic fissure which accommodates the gall-bladder, and divides the central lobe into

<sup>1</sup> Medical Times and Gazette, vol. i. 1872, p. 293.

two parts—a smaller, lying to the left, and a larger irregularly quadrilateral mass, which lies to the right of the gall-bladder. The right hepatic segment, moreover, presents well-marked Spigelian and caudate lobes. These are quite continuous with each other, and extend along the posterior margin of the transverse or portal fissure.

The gall-bladder, situated on the right central lobe, is of large size and regularly pyriform. The cystic duct is  $1\frac{1}{2}$  inch in length, and unites with the left hepatic duct, which, after a farther course of half an inch receives the right hepatic duct. The common bile-duct, formed as described, enters the duodenum along with the duct of the pancreas.

In respect of the liver, *H. crocuta* agrees closely with *H. striata* and *H. brunnea*, differing from the former, however, in the absence of the sharp curvature of the neck of the gall-bladder described by Daubenton<sup>1</sup>, and referred to by Meckel<sup>2</sup>. The resemblance of this viscus to that of *Proteles* is no less striking, the only difference between them consisting in the more complete separation of the lobes in *H. crocuta* than in *Proteles*.

*Pancreas*.—Measures one foot in length, and has an average breadth of one inch. It occupies the usual position.

*Spleen*.—Elongated and tongue-shaped, measures 16 inches in length; its borders are very irregular, but without distinct fissures. Its widest portion is 3, and its narrowest 1 inch in breadth. These measurements correspond closely with those of the organ in other species of *Hyæna*. The viscus differs from that of *Proteles*<sup>3</sup> only in its larger size and in the absence of any oblique fissure on its outer surface.

### *Larynx and Respiratory Organs.*

*Larynx*.—The superior aperture of the larynx is guarded by an epiglottis of large size; its posterior surface is deeply concave, and its apex uniformly rounded. In respect of its form this structure resembles much more closely that of the Felidæ than of the Canidæ, in the latter of which it is distinctly triangular and almost flat. The thyroid cartilage is wide, and, as observed by Prof. Flower in *Proteles*, destitute of a fissure on its lower margin. It differs from the thyroid cartilage in both Felidæ and Canidæ in the much greater projection of its anterior tubercle. The cricoid cartilage is of the same general form as in *Proteles*, differing from the latter, however, inasmuch as its upper border posteriorly is not prolonged into a median pointed spine. In consequence of this the aryænaoid cartilages extend beyond the highest point of the cricoid, and are not situated below the level of its posterior median spine as is the case in *Proteles*. The false vocal cords (which, according to Mayer<sup>4</sup>, are absent in *H. striata*) are rounded and soft, and are placed very obliquely between the aryænaoid and thyroid cartilages, their anterior extremities being

<sup>1</sup> *Loc. cit.*

<sup>2</sup> *Op. cit.* vol. viii. p. 720.

<sup>3</sup> Prof. Flower, *loc. cit.*

<sup>4</sup> "Ueber den Bau des Organes der Stimme," *Nova Acta Acad. Naturæ-Curios.* vol. xxiii. 1851, p. 694.

placed higher in the laryngeal box than the posterior. They are (as is the case also in *Proteles*) separated from the base of the epiglottis in front and from the arytaeno-epiglottidean folds of mucous membrane of each side by a deep sinus, the mucous membrane of which is smooth and glistening. The space enclosed by the false cords is oval in form and of such width that the true vocal cords can be readily seen from above. The latter are much stronger and thicker than the false cords, and approach more closely to the middle line of the larynx; between them is the rima glottidis, which is triangular in form. Judging from Mayer's figure of the larynx of *H. striata*, that of *H. crocuta* closely resembles it, differing, however, in the possession of well-marked false vocal cords, which, according to the author named, are absent in the former species. At the same time it is to be observed that Meckel<sup>1</sup> does not deny the presence of both false and true vocal cords in the larynx of *H. striata*. Taken as a whole, the larynx of *H. crocuta*, like that of *Proteles*, as pointed out by Prof. Flower, presents a greater resemblance to that organ in the Felidæ than in the Canidæ, differing from the former, however, in the oblique position and diminished prominence of the false vocal cords, and from both in the greater projection anteriorly of the thyroid cartilage, as well as in the presence of a sinus which separates the false cords from the base of the epiglottis and arytaeno-epiglottidean folds of mucous membrane.

*Thyroid gland.*—Is very small and of an elongated-oval form. It lies under cover of the sterno-thyroid muscle, and extends on each side from the middle of the cricoid cartilage down to the sixth tracheal ring. The two halves are not connected by an isthmus.

*Trachea.*—Is 11 inches in length. It possesses 49 cartilaginous rings (according to Meckel<sup>2</sup> 53); individual variation may account for this difference. The rings vary very much in breadth. In the trachea of *H. striata*, according to Meckel, there are 45, according to Reimann<sup>3</sup> and Wolff<sup>4</sup> there are but 36; in *Proteles* Mr. Flower counted 36.

*Lungs.*—The *right* lung is divided into 6 lobes, the left into 3. In the right lung there are two horizontal fissures, the lower of which indicates the separation between a basal lobe (which forms about one half of the lung) and the rest of the organ. The upper or apical half is divided into four lobes through the intersection of the upper horizontal by a vertical fissure. Of these, the lower and posterior lobe is almost square, and clearly separated from that above and below it, whilst the two anterior lobes are scarcely so well defined by reason of their coalescence towards the root of the organ. The sixth is the so-called azygos lobe, and lies between the upper and lower halves of the lung. The *left* lung is divided into an upper, a middle, and a lower lobe by means of two horizontal fissures, the inferior of which separates the lower from the upper half of the lung, whilst the upper divides the latter into two parts. Of these, the upper is the larger. On the outer surface of this lobe is a

<sup>1</sup> *Op. cit.* vol. x. p. 635.

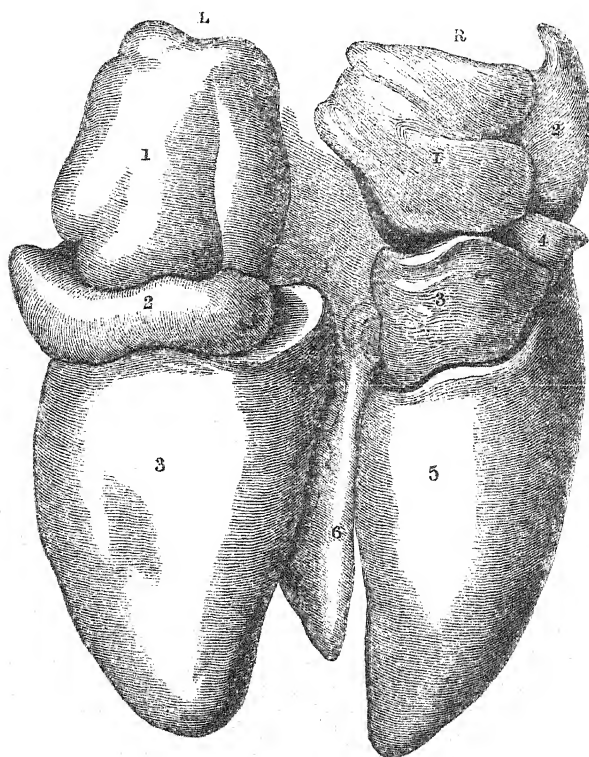
<sup>3</sup> De Hyæna, Berol. 1811, p. 16.

<sup>2</sup> *Op. cit.* vol. x. p. 485.

<sup>4</sup> De org. vocis, Berol. 1812, p. 10.

vertical fissure, which indicates as it were, a tendency towards the more complete subdivision of the right lung. In respect of the number of pulmonic lobes *H. crocuta* differs from both the other species of *Hyæna*, in each of which the right lung possesses four and the left three. Dr. Murie mentions the presence of two marginal clefts in the upper lobe of the right lung of *H. brunnea*, which would

Fig. 4.



Lungs of *Hyæna crocuta*, distended and seen from behind.

R. Right lung: the figures 1, 2, 3, 4, 5, and 6 indicate the separate lobes, the latter figure being placed on the so-called azygos lobe. L. Left lung: the figures 1, 2, and 3 indicate its component lobes.

appear to indicate an approach to the arrangement described above in *Hyæna crocuta*. At the same time, the subdivision described by that author of the azygos lobe in the former does not obtain in the latter species. Meckel<sup>1</sup> states that in *H. crocuta* the lungs present

<sup>1</sup> *Op. cit.* vol. x. p. 492.

the same number of lobes as in *H. striata*; but this was not the case in our specimen. In *Proteles* the subdivision of the lungs resembles that in *H. striata*, but differs in the presence of two notches in the anterior border of the middle lobe on the left side. In respect, therefore, of the form of the lungs, *H. crocuta* differs more from either of the other species than they do from each other.

### Vascular System.

*Heart*.—Is short and broad, as in the other species of *Hyæna*. Its cavities present the usual characteristics of the carnivorous heart. The fossa ovalis is clearly defined. There is no trace of a Eustachian valve. The aortic arch gives off two large trunks, of which that to the right is the innominate, which, as in the majority of Carnivora, divides into the right subclavian and right and left carotids. The second branch is the left subclavian. The trunk of the abdominal aorta gives off close to its termination the two external iliac arteries, and after a further course of 1 inch divides into the two internal iliac and caudal arteries. The origin of the external and internal iliac arteries as distinct branches of the abdominal aorta appears to be a somewhat unusual occurrence, so much so that it is mentioned by Prof. Huxley<sup>1</sup> as one of the characteristics of the *Didelphia*. Whether this arrangement occurs in other species of *Hyæna* is not mentioned by those authors who have examined them.

### Urinary and Generative Organs.

*Kidneys*.—Are situated very far back, the posterior extremity of each lying in the iliac fossa. The surface is smooth, and presents no trace of lobulation. They are globular in form, and much resemble the renal organ in the true Felidæ. As in them, a number of arborescent veins ramify upon the surface of the organ. On section, the kidney is seen to be composed of a single large pyramid, provided with a single papilla, and consequently differs in this respect from that of *H. brunnea*, in which, according to Dr. Murie<sup>2</sup>, the cones are eight in number, at least in the cortical portion. In *H. striata*, Hunter<sup>3</sup> found a similar arrangement to that described in *H. crocuta*. The remaining portions of the urinary and sexual organs have been described before<sup>4</sup>.

### BRAIN.

The brain of *H. crocuta* so closely resembles in all respects that of *Proteles*, of which an excellent description has been given by Prof. Flower<sup>5</sup>, that we have thought it unnecessary to enter into any lengthened description of this organ. At the same time, having regard to his observation that the brain of the *Hyæna* has not hitherto

<sup>1</sup> 'Manual of Anatomy of Vertebrated Animals,' p. 327.

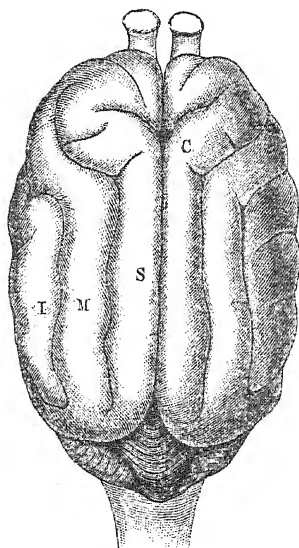
<sup>2</sup> Trans. Zool. Soc. vol. vii. p. 507.

<sup>3</sup> 'Essays and Observations,' by Owen, vol. ii.

<sup>4</sup> Proc. Zool. Soc. 1877. p. 369, and 1878, p. 417.

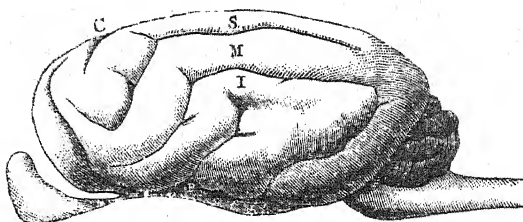
<sup>5</sup> Proc. Zool. Soc. 1869, p. 478.

Fig. 5.



Brain of *Hyæna crocuta*, two thirds natural size. Upper surface.  
*C*, crucial sulcus; *S*, superior, *M*, middle, *I*, inferior external gyri.

Fig. 6.



Brain of *Hyæna crocuta*, lateral view.  
*F*, sylvian fissure; other letters as in fig. 5.

been figured, and in view of the probable wants of subsequent investigators, we have thought it right to add the accompanying drawings. An examination of these, and comparison of them with Prof. Flower's figures of the brain of *Proteles*, will show that, except in respect of size, and the absence of a distinct fissure in that convolution which bounds the Sylvian fissure posteriorly, the description and comparative remarks of that anatomist apply equally to the brain of *H. crocuta* and to that of *Proteles*. The hemispheres of the brain measured each  $3\frac{1}{4}$  inches in length; and the greatest breadth of the two together was  $2\frac{5}{8}$  inches.

### MYOLOGY<sup>1</sup>.

To avoid the necessity of constant references in making comparisons of the muscles of the Spotted Hyæna, we wish it to be understood that, unless otherwise stated, the observations regarding *H. striatu* and Cat have their source in Meckel's 'Anatomie Comparée,' those relating to the Dog in Douglas's 'Myographiæ Comparatæ,' whilst the notes respecting *H. brunnea* are derived from Dr. Murie's paper previously quoted, and those in connexion with the Civet from a paper by Macalister<sup>2</sup> and partly from our own dissections.

#### *Muscles of the Head and Neck.*

The *platysma myoides* consists of a strong broad sheet of muscular fibres, extending from the anterior half of the neck, covering the masseter and part of the mandible, and blending in front with the deeper muscles in the neighbourhood of the mouth.

Inasmuch as the region of the face was unfortunately somewhat damaged prior to our dissection, we are unable to give so accurate an account of its muscles as we would wish. They appeared however, to be strongly developed, and to consist of the following:—*orbicularis oris*, the external fibres of which take an attachment to the margin of the lateral nasal cartilage; *orbicularis palpebrarum*, which surrounds the eye, and has a bony attachment to the superior maxillary bone.

A *zygomaticus* runs from the temporal fascia in front of the ear to the angle of the mouth. There is also a strong *levator labii superioris et alæ nasi* and a smaller *levator anguli oris*. *Buccinator* is thin.

An *occipito-frontalis* is attached posteriorly to the temporal fascia in front of the ear, whilst anteriorly its fibres blend with those of the *orbicularis palpebrarum*.

*Temporal*.—This muscle, which possesses the ordinary attachments, is almost characteristic of the genus by reason of its great magnitude. In *H. brunnea* Murie speaks of it as enormous even for a Carnivore. As in *H. striata* and *H. brunnea*, so here the superficial fibres are with difficulty separable from the masseter.

<sup>1</sup> See Plates V. and VI.

<sup>2</sup> "The Muscular Anatomy of the Civet and Tayra," Proc. Roy. Irish Acad. vol. i. ser. 2, p. 506.

The *masseter* is also very large; its attachments are as usual in Carnivores. Dr. Murie states that in *H. brunnea* "the masseter is clearly divisible into two layers, notwithstanding Meckel's assertion that this is less marked in the *Hyæna* than in the Cat." *H. crocuta* bears out the assertion of Meckel.

Of the two *pterygoid muscles* the internal is by far the largest. Arising from the external surface of the pterygoid bone, it is inserted into the ramus of the mandible, as also into its angular process.

The external pterygoid arises immediately above the internal, and passes to the neck of the lower jaw. Compared with the internal pterygoid, to which, by reason of an upward direction of its fibres, it is apparently antagonistic, this muscle is very small. Meckel notes a similar condition of the pterygoid in Carnivora generally.

The superficial muscles of the external ear are as follows:—*zygomatico-auricularis* from the zygoma to base of concha; *temporo-auricularis externus*, the origin of which is blended with the posterior belly of the occipito-frontalis just in front of the ear, inserted into the anterior margin of the conchal cartilage; *temporo-auricularis internus* from the temporal fascia immediately above zygoma to the inner side of concha.

*Cervico-auricularis* (superficial), narrow and riband-like from the ligamentum nuchæ to back of concha. Deep *cervico-auricularis* arises broad and fleshy from the temporal fascia close to the spine of occiput. It is inserted into the projecting part of conchal cartilage.

There are also well-marked *scuto-auriculares* (internal and external), and, in addition, certain intrinsic muscles, of which the best-marked are a vertical muscle of the concha running on the dorsum towards the tip, and two transverse muscles.

*Sterno-mastoid* arises in common with its fellow, to which it remains united for a little distance in front of the prosternum. It divides at once into two parts, of which the larger and internal decussates with the corresponding fibres of the opposite muscle as far forward as the larynx, and is finally inserted into the base of the mastoid process; whilst the smaller and more external part runs forward to end in the deep cervical fascia, and through it is attached to the occiput. This double character of the sterno-mastoid is remarked in *H. striata* and *H. brunnea* by Meckel and Murie respectively. It is also figured in the 'Recueil' (pl. 137) of Cuvier and Laurillard.

In Civet there is a cleido-mastoid entirely separate from the sterno-mastoid.

*Digastric*, as usual from the temporal bone, passes to the middle third of the inferior border of the lower jaw.

The *sterno-hyoid* and *sterno-thyroid* muscles arise close together from the thoracic surface of the sternum; quite separate they pass forwards, and have their usual insertions. A *thyro-hyoid* exists, and has the ordinary attachments; the *crico-thyroideus* is well marked. The *omo-hyoid* is absent, as in the Cat, Dog, Civet, and apparently in the majority of Carnivores. Meckel, however, affirms its existence as a small muscle in *H. striata*; it is not referred to by Murie in *H. brunnea*.



The *mylo-hyoid* extends from the inner surface of the mandible (where its attachment reaches from the anterior margin of the ramus to about two inches from the symphysis) to the hyoid bone posteriorly, and in front of this to a median raphe common to it and its fellow.

*Genio-hyoid* and *genio-hyoglossus* muscles, arising from the symphysis of the lower jaw, have their usual insertions. The *hyoglossus* is also normal in its connexions.

*Styloglossus*, usually strong in Carnivores, is in *H. crocuta* very large. It arises from the *cranial end* of the stylo-hyal bone, and passes to the side of the tongue. Wide in the Civet, it arises from the *middle* of the stylo-hyal.

The *stylo-pharyngeus*, also very strong, is from the stylo-hyal and tympano-hyal bones.

There is no *stylo-hyoid*. Meckel states that this muscle, which is ordinarily wanting in Carnivores, is present in *H. striata*, Cat, Dog, and Genet; Macalister found it in the Civet.

*Scaleni*.—Of these there are but two, both of which are situated behind (dorsad) the brachial plexus; consequently the *scalenus anticus* must be regarded as wanting.

The *scalenus medius* passes from the transverse processes of the fifth, sixth, and seventh cervical vertebræ to the first rib. *S. posticus* is from the fifth cervical vertebra to the fourth and fifth ribs.

The scalene muscles in *H. crocuta* are therefore similar in arrangement to those of *H. striata* and Dog, as described by Meckel. Douglas, however, avers the existence of three scalenes in the latter animal, thus agreeing with *H. brunnea*, in which, according to Murie, a *s. anticus* exists along with the *medius* and *posticus*; such is also the condition which obtains in the Civet.

The *rectus capitis anticus major*, from the transverse processes of the second to the sixth cervical vertebræ, to the basiocciput is but indistinctly separated from the *rectus capitis anticus minor*. The latter muscle springs from the arch of the atlas, and lies under cover of the major.

*Longus colli* occupies the cervical and anterior dorsal regions. Its fibres extend between the transverse processes and bodies of the various vertebræ over which it passes, with the exception of the axis, and terminate anteriorly at the arch of the atlas. These muscles do not differ materially in the Carnivora.

*Splenius* arises from the whole length of middle line of the neck, first two dorsal spines, articular processes of last five cervical and first dorsal vertebræ; it has its insertion solely into the outer half of the transverse ridge of the occiput. There is therefore no *splenius colli* present. This condition is usual in Carnivores. Douglas, however, notes a cervical attachment of *splenius* in the Dog.

*Complexus*.—This muscle forms an enormous fleshy mass in the region of the neck. It arises from the last five cervical articular processes and from the anterior two dorsal spines. Insertion is into occiput beneath splenius. There is no division into *complexus* and *digastric*, such as Meckel notes in *H. striata*.

*Complexus tertius*.—A series of strong fleshy bundles extends between the articular processes of the posterior cervical vertebræ; continued forwards as a separate muscular band, the fibres pass to the transverse process of the atlas, forming the muscle so-named. Murie describes a similar structure in *H. brunnea*, and regards it as corresponding to the *complexus tertius* in *Hyrax*.

The homological significance of this muscle appears, however, to have received varied interpretations by different anatomists, *e.g.* Mivart and Murie<sup>1</sup>, recording their observations on the Myology of *Hyrax capensis*, write that "Meckel describes it as the *transversalis cervicis*; but this," they proceed to say, "it cannot be, as the *transversalis cervicis* is always the continuation into the neck of the *longissimus dorsi*, whereas our muscle lies distinctly internal to such continuation;" they further state that the true *transversalis cervicis* is the *cervicalis ascendens* of Meckel.

Whilst agreeing with the view of Mivart and Murie as to the nature of the muscle under consideration, and regarding it as a *complexus tertius*, we must take exception to their exposition of Meckel's views. We do not believe that Meckel described the muscle under any name, certainly in no case as forming solely the *transversalis cervicis*; neither does he confound the *cervicalis ascendens* with the *transversalis cervicis*.

The posterior *recti* and *obliqui* have their usual attachments. *Obliquus inferior* is comparatively very large. The *rectus capitis posticus major* consists of two parts, superficial and deep; such is also the case in the Dog, Bear, and Civet. *Rectus capitis lateralis* is inseparable from the superior oblique.

*Spinalis colli* extends from the first dorsal and last five cervical spines to the spine of the axis; there is no *semispinalis*.

The cervical *intertransversales*, arranged in pairs, are exceedingly large and strong.

#### *Muscles of the Back, Thorax, and Abdomen.*

The *panniculus carnosus* in *H. crocuta*, as in Carnivores generally, forms an extensive muscular sheet, specially strong on the lateral aspects of the trunk, and extending more or less over the dorsal and ventral regions. It arises from the fascia over the *latissimus dorsi*, and posteriorly from that covering the thigh. There is, however, no femoral attachment. The fibres converge towards the axilla and join the *latissimus* about four inches above its humeral attachment.

*Trapezius* is small. It arises from the spines of the seven anterior dorsal vertebræ and from the ligamentum nuchæ opposite the last two cervical spines. Its insertion is into the whole length of the scapula. This represents the posterior part of the trapezius of Meckel in *H. striata*, his anterior portion being our *levator humeri*.

The *latissimus dorsi* takes origin from the posterior eleven dorsal spines and from the lumbar aponeurosis; it has no costal attachment. Joined by the *panniculus*, it is inserted along with the *teres*

<sup>1</sup> "On the Myology of *Hyrax capensis*," P. Z. S. 1863, p. 333.

major into the shaft of humerus at the junction of its upper and middle thirds. It agrees closely with Meckel's description of this muscle in *H. striata*, and also with what exists in *H. brunnea* and Civet. As in them, it also gives off a *dorsi epitrochlearis*.

The *rhomboideus* is a single muscle. It arises from the ligamentum nuchæ corresponding to the last two cervical vertebræ, and also from the anterior four dorsal spines. Insertion is into the superior costa, as well as about an inch of the anterior costa, of the scapula.

It has no occipital attachment such as Meckel found in *H. striata*, in this respect agreeing with *Viverra* and, according to Douglas, with the Dog.

Superior and inferior *serrati postici* are not combined as in *H. brunnea*; though almost continuous, they are distinguishable by the different direction of their fibres. The superior is from the seven anterior dorsal spines, its costal attachment extending from the fourth to the eleventh ribs. Inferior *serratus* is from the lumbar aponeurosis to the four posterior ribs.

*Erector spinæ* is subdivided as usual. The *sacro-lumbalis* small, is inserted into the last four ribs; it is prolonged forwards, however, to the first rib by a *musculus accessorius*. There is no cervical continuation in the form of a *cervicalis ascendens*.

The *longissimus dorsi*, smaller than the *spinalis dorsi*, is attached by fleshy bundles to the ten anterior dorsal transverse processes, and by tendinous slips to the corresponding ribs. An enormous *transversalis cervicis* is continued into the neck. It arises from the posterior four cervical and anterior four dorsal articular processes, receiving in addition accessory bundles from the third, fourth, fifth, and sixth dorsal spines; it is inserted into the transverse processes of the last five cervical vertebræ. The *trachelo-mastoid* is absent.

*Spinalis dorsi*, the innermost and largest subdivision of the *erector*, is inserted into the spines of the anterior dorsal and last two cervical vertebræ.

Apparently these muscles are similarly arranged in *H. striata* and *H. brunnea*. In these animals the unusual nature of the relative sizes of the dorsal muscles, the one to the other, is noted by Meckel and Murie respectively. As Dr. Murie puts it, "the *serrati postici* usually small, are here large; the *sacro-lumbalis* and *longissimus dorsi*, on the contrary, are comparatively small, although in themselves of no mean bulk; but the *spinalis dorsi* obtains by far the largest dimensions, and is indeed a very powerful muscle of enormous magnitude." In the main these remarks are equally applicable to *H. crocuta*.

In the Civet Macalister records a *cervicalis ascendens* and also a *trachelo-mastoid*.

The *multifidus spinæ* extends as far back as the seventh caudal vertebra. *Rotatores spinæ* are large; the *interspinales* are also well marked.

*Levatores costarum*, with the usual attachments, are very strong; their fibres are quite continuous with those of the external intercostal muscles.

*Serratus magnus* arises from the transverse processes of the five posterior cervical and first dorsal vertebræ, and by seven costal slips from the eight anterior ribs, excluding the first. It is inserted into the vertebral border and part of the ventral surface of the scapula. The muscle is similarly arranged in *H. striata*. In the Civet the cervical part is limited to four vertebræ; and in the Dog the costal attachment is less by one digitation.

The *intercostal* series of muscles are normal.

*Triangularis sterni* strong and well marked. It takes origin from all the pieces of the sternum except the first, and passes to the cartilages of the second to the sixth ribs inclusive. A separate muscular band arises from the side of the eighth sternal segment, and runs transversely to the posterior margin of the seventh costal cartilage; though distinct from the triangularis and interposed between it and the intercostal muscles, it can only be regarded as an aberrant slip of that muscle.

The *diaphragm* has the ordinary attachments. It possesses no special aperture for the passage of the vena cava, that vessel passing with the aorta *behind* the crura.

Of the abdominal muscles the *external oblique* is from the last eleven ribs to its usual insertion. The *internal oblique* is easily separable from the *transversalis*.

*Rectus abdominis*, from the posterior extremity of the symphysis pubes, is inserted into the seven anterior costal cartilages, close to the sternum. The prolongation of the rectus to the first rib is usual in Carnivores. As in *H. brunnea*, there is no *pyramidalis*; this muscle is also absent in *H. striata*. There is but a single *supracostalis*; it extends from the cartilage of first rib to the aponeurotic insertion of the rectus opposite the third and fourth costal cartilages. Two such muscles are noted in *H. brunnea*, whilst the Dog agrees with *H. crocuta* in possessing only one ("musculus in summo thorace situs" of Douglas).

*Coccygeus* is attached to the roots of the transverse processes of the first three coccygeal vertebræ and to the ischial spine.

The remaining muscles of the region, *i. e.* those in relation to the generative organs and rectum, are described in a previous communication.

The tail is supplied with a *levator caudæ*, which arises from articular processes of the last three lumbar vertebræ, and is reinforced by muscular slips from the laminæ of the caudal vertebræ, into the spines of which it is inserted by means of delicate tendons.

The *depressor caudæ*, from the bodies of sacral and coccygeal vertebræ, receives also a special muscular slip from the pelvic aspect of the ilium. Its insertion is by narrow tendons into the bodies of the caudal vertebræ.

*Laterales caudæ* are constituted by the intertransversales of the caudal region.

#### *Muscles of the Fore Limbs.*

*Pectoralis major*, from the whole length of the sternum, and ex-

tending forwards for about one inch from a mesial raphe in the neck, this muscle is inserted into the whole length of the shaft of the humerus, from the bicipital groove down to the elbow. The fibres are easily separable into a superficial and a deep stratum, thus corresponding closely to the arrangement in *H. striata*.

In the Civet the pectoralis major, as in the Dog, consists of three strata, whilst its insertion is much more limited than in *H. crocuta*.

*Pectoralis minor* wanting, as in Carnivores generally<sup>1</sup>.

*Deltoid* consists of two parts—one, narrow, from the tip of acromion, and a second, wider, from the fascia covering the infraspinatus; they are inserted together into the deltoid ridge of the humerus. The so-called clavicular portion of the deltoid we describe with the *levator humeri*; but including this element, the deltoid of *H. crocuta* is evidently the same as Meckel describes in *H. striata*, and agrees with what we find in *Viverra*. Douglas describes the deltoid in the Dog as we do in *H. crocuta*, the acromial and scapular portions, however, not being so easily separable.

*Levator humeri proprius* (Douglas) arises by two heads—one, thin, from the anterior half of the neck, dorsal mesial line, and a second, riband-like in character, from the mastoid process. The heads unite in front of the shoulder-joint; and the resulting belly is inserted into the lower end of the shaft of the humerus, in front of the biceps.

This corresponds to the *cephalo-humeral* described by Murie in *H. brunnea*, whilst by Meckel it is in *H. striata* regarded as a portion of the double trapezius.

The *subscapularis*, from the venter scapulæ (except so much as affords attachment to the serratus magnus) to the smaller humeral tuberosity. *Infraspinatus* and *supraspinatus* are both strong and well developed; they, as well as the *subscapularis*, present no deviation from the usual arrangement.

*Teres minor* is small, but is distinct from the *infraspinatus*, as in Civet and Dog.

A *levator scapulæ* (trachelo-acromial) arises from the inferior border of the transverse process of the atlas, and runs to the acromial process of the scapula. The same arrangement is mentioned by Meckel in *H. striata* and *Viverra*, and by Douglas in the Dog.

*Teres major* is from the upper half of the posterior margin of the scapula. Its insertion unites with that of *latissimus dorsi*, as in Civet.

The *biceps* is single-headed, attached above to the upper border of the glenoid cavity, and below to the inner borders of both radius and ulna. In respect of origin it agrees with *H. striata* and Dog. In the Civet the biceps is coracoid in origin, and entirely radial at its insertion.

*Brachialis anticus*, from almost the whole length of the posterior surface of the shaft of humerus, winds round the outer side of the lower half of that bone, and is inserted into the upper two inches of the internal border of the ulna. The arrangement is essentially the same in the Civet and Dog.

<sup>1</sup> Cuvier, Leçons d'Anat. Comp. vol. i. p. 256.

The *coraco-brachialis* is a *c. brevis* (Wood). It springs from the upper border of glenoid cavity, and passes to the shaft of the humerus just above the insertion of the *latissimus*. Such, according to Wood<sup>1</sup>, is also the arrangement in the Dog and Cat; and so have we found it in the Civet. In other of the Carnivora, *e. g.* Bears, the *coraco-brachialis* exists as a double muscle, corresponding to the long and short varieties of Wood.

The *triceps* possesses four distinct heads. Of these the scapular, very large, springs from nearly the whole length of the axillary costa of scapula. The second and third arise from the upper third of the humeral shaft, and are separated by the origin of *brachialis anticus*. The fourth head is a small muscular bundle from the olecranon-fossa and adjoining part of the shaft of humerus. These heads have a common insertion into the olecranon process of ulna.

In the Civet the muscle is similarly constituted; the long head, however, is more limited at its scapular attachment.

*Supinator longus* is absent; a tendinous vestige exists and apparently represents it. According to Meckel it is also wanting in *H. striata*; whilst Douglas records its absence in the Dog. In the Civet, however, it exists, comparatively small and feeble, but quite distinct.

The *extensores carpi radiales longior et brevior* arise conjointly from the outer condyloid ridge of humerus. Fused for some distance the two muscles are inseparable; the respective fibres, however, terminate on two separate tendons, which are inserted into the metacarpals of index and middle digits. The muscular fibres at the origin are similarly interblended in the Civet and Dog, whilst in *H. striata* Meckel describes the muscles as distinct throughout, the tendons being united by a transverse band.

*Extensor communis digitorum*, from the outer condyle and intermuscular fascia, terminates in the usual manner, passing to the four outer toes.

There is an *extensor carpi ulnaris*, from the external condyle to the base of metacarpal of little digit.

A small *supinator brevis* passes from the orbicular and external lateral ligaments to the radius anteriorly, reaching just below the elbow.

A double *extensor minimi digiti* springs from the outer humeral condyle; its tendons pass to the two outermost digits (*annularis* and *minimus*). The same obtains in *H. striata*. In the Civet the muscle terminates by three tendons, which are distributed to the three outer toes; whilst, according to Douglas, in the Dog there is but a single tendon of insertion, this being confined to the fourth digit (*annularis*).

The *extensor primi internodii* is wanting or is quite inseparable from the *extensor ossis metacarpi pollicis*. The latter arises from the whole length of internal surface of ulna and adjoining interosseous membrane, and also slightly from the upper end of the radius. It is inserted into the base of rudimentary pollex. Such also is the arrangement in the Dog, Civet, and *H. striata*.

An *extensor indicis* passes from the middle of the external border

<sup>1</sup> Wood, "on Muscular Variations," Journal Anat. and Phys. vol. i. p. 55.

of ulna to the index finger, there joining the common extensor tendon in the usual manner. Meckel notes an extensor indicis in *H. striata*, but says it is distributed to the third finger.

In the Civet a conjoined *extensor secundi et indicis* is found.

The *pronator radii teres*, from internal condyle of humerus to junction of upper and middle thirds of radius, is slender; it does not differ from that of *H. striata*. In the Civet, on the contrary, the muscle is particularly strong, and extends down to the lower end of the radius.

In *H. crocuta*, the smallness and comparative feebleness of the round pronator is compensated by an extensive *pronator quadratus*, which is attached to the whole length of the bones of forearm. Large also in *H. striata*, Dog, and Cat, it is limited in Civet to the lower third of the forearm.

The *flexor carpi radialis* arises from the inner condyle, and is inserted into the base of the second metacarpal bone. In the Civet there is an additional inferior attachment to the base of the first metacarpal.

*Palmaris longus* is quite distinct from the inner condyle, and terminates in a strong palmar fascia. Meckel states that in *H. striata* this muscle is intimately blended with the superficial flexor of the digits. According to Douglas, it is entirely wanting in the Dog. In the Civet, on the other hand, somewhat remarkably, it forms a double muscle from end to end.

*Flexor carpi ulnaris*, from the internal condyle of humerus to the pisiform bone, is prolonged also to the outermost metacarpal. So also in *H. striata* and Civet; in the latter animal an olecranon origin likewise exists.

*Flexores digitorum*.—The superficial and the deep form one large irregular muscular mass. This arises from the internal humeral condyle, and also from the bones of forearm—one slip taking origin from the upper extremities of both radius and ulna, while a second comes from the whole length of the posterior border of ulna. Below the middle of the forearm the muscle divides into two parts, a superficial and a deep.

The superficial (*perforatus*) is distributed by means of separate tendons to the four outer toes, each tendon ending at the middle phalanx of its respective digit, and giving passage to the corresponding deep flexor tendon in the usual manner.

The deeper part of the muscle (*perforans*) ends in a single broad tendon which divides into four, and so is distributed to the same four toes as the superficial tendons, perforating these latter, and reaching the terminal phalanges of the digits. This complication of the flexors of the digits appears to be common in the Carnivora. A particularly interesting modification, however, exists in the Civet, in which animal the distribution of the *perforatus* (*i. e.* the superficial part of the common flexor mass as in *H. crocuta*) is limited to the three middle digits, no tendon passing to the outermost. The latter, however, possesses a special little muscle<sup>1</sup> which arises from the

<sup>1</sup> Mivart and Murie describe a similar muscle in *Hyrax capensis* (P. Z. S. 1865, p. 341), and designate it "flexor brevis manus."

pisiform bone and from the annular ligament ; the fibres terminate on a tendon which, after being pierced by the deep flexor tendon of the fifth digit, is inserted into the second phalanx of that digit, and consequently represents its superficial flexor tendon. A similar but smaller muscular slip runs to the fourth toe, and joins the superficial flexor tendon.

Somewhat analogous is the condition elaborately described by Meckel in *H. striata*—the palmar accessory slips, however, not being confined to the two outer digits as in the Civet, but running to all four, each tendon of the superficial flexor thus receiving an additional slip. In *H. striata*, it is to be noted, the accessory slips are altogether tendinous, apparently springing simply as offsets from the expansion of palmaris longus. They do not possess the muscular portions so well marked in the case of the Civet.

There is no representative in *H. crocuta* of the *flexor longus pollicis* described by Meckel as existing in *H. striata*.

*Lumbricales* are four in number. All arise from the palmar surface of the common deep flexor tendon, and pass to be attached to the deeper aspect of the superficial flexor tendons. The nature of this peculiar attachment of the lumbricals is apparently the same in *H. striata*, and is to be found figured in Cuvier and Laurillard's 'Recueil,' pl. 141. fig. 3.

In the hand, the pollex, as in *H. striata*, is deprived of any special muscles ; the little finger is furnished with an *abductor minimi digiti* ; this, from the pisiform bone, joins the extensor-expansion on dorsal aspect of first phalanx of fifth digit. This muscle also exists in the Civet. According to Douglas it is wanting in the Dog. In this latter animal Douglas avers the presence of a small flexor and an opponens of the pollex.

The *interossei* muscles are strong and well developed, their arrangement being very similar in Carnivora generally. In *H. crocuta* a deep set comprises eight fleshy bundles arranged in pairs, two to each metacarpal, situated rather on the palmar aspect of these ; they arise from their proximal ends, and pass to the sides of the bases of the first phalanges, reaching as far as the extensor-tendon.

In addition to these paired muscles are two single ones (palmar interossei). These arise together from the bases of the third and fourth metacarpals. They are distributed to the middle and outermost digits respectively.

### *Muscles of the Hind Limbs.*

In Carnivores generally the *gluteus maximus (externus)* is more or less divisible into two parts—this, as observed by Meckel, being especially well marked in *H. striata*.

In *H. crocuta* a similar disposition holds good—the anterior part of the muscle, thin and flat, springing from the spines of the posterior sacral vertebræ, and passing to the fascia lata, whilst the posterior moiety, forming a perfectly distinct elongated and fusiform bundle, springs from the transverse processes of the three anterior caudal



vertebræ and terminates by a tendon which, blending with the fascia lata immediately above the knee-joint, is continuous with the *biceps flexor cruris*.

The *gluteus medius*, as usual, exceeds in bulk the so-called maximus. It arises from the external surface of the iliac bone and from the fascia covering the muscle, and is inserted into the outer surface of the great trochanter of the femur.

Perfectly distinct, the *gluteus minimus* arises behind the last-mentioned muscle from the gluteal surface of the ilium and from the dorsum acetabuli. Its insertion is into the antero-external border of the great trochanter. The muscle is partially divisible into two, the posterior fibres passing to their insertion on a deeper plane than the anterior.

A fourth gluteus (*gluteus quartus*) arises from the anterior border of the acetabulum over the reflected tendon of the rectus femoris, and is inserted into the middle of the anterior intertrochanteric line. This muscle appears to have been first described by Douglas in the Dog, under the name of "musculus parvus in articulatione femoris situs." Its existence in *H. striata* is noted by Meckel, and in the Civet by Macalister ("gluteus quintus") and ourselves.

The *pyriformis* has origin from the middle third of the ventral surface of the sacrum, and, running quite distinct and separate, is inserted into the great trochanter. Meckel found it in *H. striata*, but notes its absence in the Bear. It exists as a distinct muscle in the Civet.

*Obturator internus*, which arises as usual, after emerging from the pelvic cavity, is accompanied to its termination by two well-marked and strong *gemelli*. The common insertion is into the trochanteric fossa.

The *obturator externus* arises from the obturator-membrane and its bony boundary. It is also inserted into the trochanteric fossa of the femur.

*Quadratus femoris* is from the outer border of the ischial tuberosity to the posterior border of the great trochanter.

The above five muscles are similarly arranged in the Carnivora generally.

Of the hamstring-muscles the *semimembranosus* is quite inseparable from the *adductor magnus*, in the description of which it is therefore included. To a more or less marked degree this union of the muscles is, according to Meckel, usual in Carnivores. He states, however, that in the Hyæna, Bear, Raccoon, and Coati the *semimembranosus* exists as a distinct muscle. We have also found it quite separate throughout in *Viverra*, though in this animal Macalister states the contrary to be the case. This latter observer further notes its separate character in the Tayra.

The *semitendinosus* arises from the ischial tuberosity, and is inserted into the internal surface of the shaft of the tibia near its superior extremity. Meckel found the insertion of this muscle to be lower in *H. striata* than is the case in *H. crocuta*; whilst in the Cynoids and Arctoids it is still lower down than in the Hyæna.

In the absence of a caudal origin the semitendinosus in *H. crocuta* differs from that of *Viverra*.

The *biceps*, strong and bulky, springs from the tuberosity of the ischium. The anterior two thirds of its fibres terminate on the ligamentous structure on the outer side of the knee, whilst the remaining third ends on a tendinous band which reaches down to the os calcis.

In the Civet the arrangement is very similar.

*Tensor fasciæ femoris*, from the anterior half of the lower border of the ilium, is inserted into the fascia lata about the middle of the outer side of the thigh. Douglas describes this muscle in the Dog as being double-headed.

The *sartorius* takes origin from the anterior spine of the ilium; and whilst one set of fibres pass obliquely to the upper end of the tibia as usual, a second set run straight down superficial to the rectus femoris, and joins this latter low down, forming an additional element in the common extensor.

The two parts so described are united simply by membrane, they themselves forming distinct muscular bundles. The muscle may be regarded, therefore, as a double sartorius, or the outer fibres as forming a *superficial rectus* or fifth extensor, such as was first described by Douglas in the Dog under the name of "extensor tibiæ primus canis proprius." In many Carnivorous animals the two bundles are united and continuous, a single muscle therefore resulting, viz. the sartorius. In the Civet such is the case, though Macalister in his specimen found it double.

The *gracilis* has a broad aponeurotic origin from the posterior part of the symphysis pubis, and also from the anterior portion of the pubic arch. It is inserted into the internal surface of the shaft of the tibia at its upper part. Exactly the same arrangement is found in the Civet and also in *H. striata*.

The *pectineus* is from the ilio-pectineal line to the middle of the linea aspera of the femur.

In the Civet this muscle is large and double at its insertion, which, however, does not extend below the middle of the shaft of femur. In the Dog, whilst the pectineus is single, according to Meckel its insertion reaches down to the internal condyle.

*Adductor magnus* arises from the pubic arch, for two inches in front of the ischial tuberosity. The fibres form a comparatively long and narrow muscle, which, bifurcating low down, is inserted partly into the line leading to the internal condyle of the femur, and also by a distinct but narrow tendon into the internal tuberosity of the tibia. This latter probably represents the insertion of the semi-membranosus, which in *H. crocuta* must be regarded as coalesced with the great adductor. In this respect, as stated before, *H. crocuta* conforms to the Carnivorous type, but differs from *H. striata*, Bear, Raccoon, Coati, Civet, and Tayra.

*Adductor brevis*, of considerable magnitude, forms the remaining and greater part of the adductor mass. It takes origin from the body of the pubis and from the anterior half of the pubic arch, and

is inserted into the whole length of the linea aspera, as well as into the internal of its lower bifurcations.

*Rectus femoris* is tolerably well developed. It originates partly from the anterior (inferior) spinous process of the ilium, and also by a well-marked reflected tendon from the dorsum acetabuli. In the Civet the two heads exist as usual, whilst in *H. striata* Meckel found that the two heads of origin were not distinct. The muscle terminates in the usual manner.

The *vasti* muscles, as in *H. striata*, are hardly separable. They form a large muscular mass which arises from the upper half of the shaft of the femur, and, with the rectus femoris and the straight fibres of the sartorius, are inserted into the anterior tubercle of the tibia.

*Crureus* is absent or is not to be differentiated from the vasti.

In the Civet there is a much more strongly marked distinction between these deeper heads of the quadriceps extensor.

*Gastrocnemius*, well developed, arises by two heads as usual; its insertion below is into the os calcis.

The *soleus* is wanting. In this respect *H. crocuta* agrees with *H. striata* and with the Dog and Cat<sup>1</sup>, but contrasts strongly with the Civet, in which the soleus exists as a separate muscle throughout. It is also present in the Bear.

*Plantaris*.—This arises along with, but internal to the external head of origin of the gastrocnemius. Its tendon joins that of the latter muscle low down, close to the os calcis, and is inserted with it. The plantaris-tendon is not continued into the sole, either as the plantar fascia or as the flexor brevis digitorum. In the Civet the plantaris is comparatively large, and its tendon does not end at the os calcis, but, expanding somewhat, runs over the tuberosity of that bone to become continuous with the flexor brevis digitorum. Meckel notes a similar prolongation of the muscle into the foot in *H. striata*.

*Popliteus* is from the external femoral condyle. Its insertion is into the posterior surface of the tibia above the oblique line, and further, extending halfway down the shaft. It is similarly arranged in *H. striata* and the Civet.

The *tibialis posticus*, as usual in Carnivores, is small but normal. Very thin and slender in *H. crocuta*, it arises below the popliteus from the middle third of the postero-internal border of the tibia. Its tendon is inserted into the scaphoid and entocuneiform bones.

The long flexor of the toes (*perforans*), representing the conjoined *flexor longus hallucis* and *flexor longus digitorum* of human anatomy, arises by two heads, of which the internal (*flexor longus digitorum*) is small and springs from the head of the fibula and intermuscular septa separating it from neighbouring muscles. The external head (*flexor longus hallucis*) is much larger; it arises from the superior extremity and upper half of the shaft of fibula, from a corresponding extent of tibia, and from the interosseous membrane. Each of these heads terminates on a distinct tendon, which, passing through a separate sheath in the annular ligament, unite in the sole of the foot

<sup>1</sup> Chauveau's 'Comparative Anatomy,' translated by Fleming, p. 309.

to form a single broad tendon from which four slips are derived; these, after perforating the superficial flexor-tendons, are inserted into the terminal phalanges of the toes.

This fusion or junction of the tendons of the flexors hallucis and digitorum exists in *H. striata*, the Dog, and Cat, and also in the Civet.

The *flexor brevis digitorum* (*perforatus*) in *H. crocuta* is confined to the sole of the foot, and is represented solely by tendon, a muscular belly being entirely wanting. This tendinous structure is attached posteriorly to the os calcis, and anteriorly divides into four slips, which, splitting for the passage of the corresponding deep flexor tendons, terminate on the sides of the second phalanges of their respective toes. Quite different is the arrangement in *H. striata*, in which the flexor brevis digitorum is described by Meckel as a prolongation of the tendon of the plantaris, receiving additional muscular fibres in the sole from the fourth metatarsal bone. The Civet presents a similar disposition, the additional muscular fibres being, however, derived from the os calcis. In the Cat a distinct muscular belly exists, springing from the tendon of the plantaris<sup>1</sup>.

*Musculus accessorius*.—This muscle exists in *H. crocuta*, exceedingly small and slender. About one inch in length, it stretches from the front of the os calcis to join the tendon of the long flexor on its outer side. Meckel does not note its presence in *H. striata*, whilst Douglas avers its absence in the Dog. Chauveau, however, speaks of its existence as a small undeveloped muscle in both the Dog and Cat<sup>2</sup>. It exists well marked in *Viverra*.

*Lumbricales* are three in number, as in the fore foot. They all spring from the tendons of the long flexor, and join those of the short. Their arrangement is as follows.—The first lumbrical arises from the superficial aspect of the deep tendon before its subdivision, and passes to the slip of the flexor brevis which is distributed to the third toe; the second arises below the first, but joins the same tendon of the flexor brevis; whilst the third arises from the point of bifurcation of the deep tendons going to the two outer toes, and is inserted into the tendon of the flexor brevis to the fourth toe.

(Note.—In speaking numerically of the respective toes, we include the rudimentary hallux.)

The *interossei* of the hind foot constitute a set of small muscular bundles, two to each toe, excluding the hallux. They all spring from the plantar aspect of the proximal extremities of the metatarsal bones, and pass upon either side of these bones to their distal ends, where they are inserted partly into the sesamoid bones and also into the extensor-tendons of the same toe; as pointed out by Meckel, they exercise principally the function of flexors.

*Extensor longus digitorum* is, as usual, in Carnivores femoral in origin, springing from the outer surface of the external condyle. Its tendon passes, along with that of the tibialis anticus, beneath the annular ligament, and gives off three slips, which are distributed to the second, third, and fourth toes, none passing to the little or outer

<sup>1</sup> Meckel, *loc. cit.* p. 451.

<sup>2</sup> *Loc. cit.* p. 311.

toe; in this respect it differs from those in the Civet and Dog. According to Meckel, in *H. striata* this muscle divides into two distinct bellies, and gives off five tendons. In the Civet the muscle is undivided.

An *extensor hallucis* does not exist as a separate muscle, a slip from the tibialis anticus being its only representative.

*Tibialis anticus* arises from the external surface of the upper third of the tibia; halfway down the leg the muscle divides into two, each division terminating on a separate tendon; of these the one (*tibialis anticus*) is inserted into the entocuneiform bone, whilst the other (*extensor hallucis*) goes to the metatarsal of rudimentary great toe.

There is no separate *extensor hallucis proprius*, such as exists in the Civet or Dog.

*Extensor brevis digitorum*, from the os calcis, terminates by three tendons, which pass to the second, third, and fourth toes. The same obtains in *H. striata*. In the Civet the muscle is distributed to the four inner toes, whilst in the Dog it is to the four outer.

*Peronæi* are two in number. Of these the *longus* arises as in *H. striata*, Bear, Coati, &c., from the external condyle of the femur; it has also an additional origin from the external tibial tuberosity. Insertion is solely into base of fifth metatarsal bone, as in *H. striata*. In the Civet it is fibular in origin, and its tendon of insertion, after giving a slip to the fifth metatarsal, is continued to the first.

The *peronæus brevis* arises below the longus from the middle two thirds of shaft of fibula, and terminates in two tendons, one of which passes on the dorsal aspect of the outer toe and joins the expansion of extensor-tendon, whilst the second is inserted into the base of the metatarsal bone of the same toe.

In *H. striata* the first tendon joins the extensor of the fourth toe. In the Dog the insertion is as in *H. crocuta*. In the Civet, and in the Bear also, a third peronæus exists ("peronæus quinti," Macalister) which, as observed by Meckel, may represent the peronæus tertius. It joins the extensor-tendon of the fifth toe over the first phalanx.

The tendency towards the formation of a third peronæus is well evidenced by the double insertion of the peronæus brevis in the Dog, and the still better marked division inferiorly in *H. crocuta*. Comparing these with the Civet or Bear, a progressive and more complete differentiation obtains, up to the formation of entirely separate muscles.

#### CONCLUDING REMARKS.

Having now described at some length the anatomy of *H. crocuta*, it may be well to add a few words by way of comparison of the structure of this with that of the other species which most closely resemble it. The arrangement of the muscular system of *H. crocuta*, so far as one can judge from an inspection of the plates of Cuvier and Laurillard, and from a perusal of the somewhat fragmentary notes which have been published with reference to other species, appears to be very similar to that of *H. striata* and *H. brunnea*, and

to differ in several important particulars from that of the Viverridæ, as well of the true Felidæ. The enormous development of the muscles of the neck and fore quarters, together with minor points already referred to, serve at once to associate *H. crocuta* with the other species of the same genus, and to separate it from the remaining groups of the *Æluroidea*. Unfortunately, so far as we can ascertain, the myology of *Proteles* has not yet been worked out; but if we may base any conclusion regarding its muscular system upon the external configuration of the animal, that system will not differ materially from what we find in *Hyæna*.

A good description of the brain of other species of *Hyæna* is still a desideratum. With the exception of Prof. Flower's observation that the brain of *Proteles* resembles that of a *Hyæna* (species unknown) in the Museum of the Royal College of Surgeons, we possess no reliable information regarding the arrangement of the cerebral convolutions in the latter genus. So far as the information derived from a comparison of the brain of *H. crocuta* with that of *Proteles* goes, it shows that these two species are closely allied to one another, and that, as pointed out by Prof. Flower in *Proteles*, so also in *H. crocuta*, the brain occupies an intermediate position between that of the true Cats, in which the convolutions are slightly more complex, and that of the Viverrids, in which they are slightly less so. The vascular system of the Spotted *Hyæna* does not present any remarkable deviation from that of the Carnivora in general, except the mode of origin of the iliac arteries. In respect of the relative lengths of the small and large intestines, this species seems to deviate from the true Cats, in which, according to Meckel, these stand in the relation of 5 to 1, and to approach the Viverrids, in which the small is to the large intestine as 12 or 15 to 1, more than do the other species of the genus. The measurement of the comparative lengths of the small and large intestines, correlatives as these are of well-defined physiological processes, appears to us to be more important in determining the affinities of closely allied species than that of the relative length of the intestine and body of the animal, the latter varying much in accordance with the habits and mode of life, whilst the food may remain the same.

The hyænoid form of larynx is well marked in *H. crocuta*, and serves to distinguish it, together with its congeners, from the other groups of the Carnivora. So far the structure of *H. crocuta* agrees closely with what we find in other species of the genus. But when we come to the consideration of the reproductive organs we meet with an element of classification which, diverging as these organs do so strikingly from the Carnivorous and even Mammalian type, would, taken *per se*, justify us in establishing a separate genus for the reception of *H. crocuta*. The unnecessary multiplication of genera appears to us, however, to be open to objection, as tending to defeat the chief object of classification; and therefore, in view of the close resemblance which otherwise exists between *H. crocuta* and other species of the genus, we think it advisable to retain for it the old generic title. And while we thus express ourselves, it may not be out

of place to remark that the occurrence of this divergence from the usual type, so far as its female organs are concerned, in an animal which in all other respects so closely resembles its fellows, may well serve to demonstrate the uncertainty of any scientific classification founded on any thing short of the consideration of the *entire* structure of any animal. Had the comparative anatomist examined only the female organs of *H. crocuta*, there can be little doubt that he would have established a separate genus, if not a family, for the reception of the animal to which they belonged. The necessity for such a course, however, is, as already pointed out, obviated by the more complete examination of the structural details of the animal.

Lastly, it might be of interest to speculate as to how in the course of evolution of three species so closely allied as the three species of *Hyæna*, two of these should have conformed to the normal mammalian type in every particular, whilst the third diverged so remarkably from that type in respect of the structural configuration of a single group of organs. Such speculations, however, do not come within the scope of a paper devoted exclusively to a record of facts.

#### EXPLANATION OF PLATES V. & VI.

Plate V. Right side of *Hyæna crocuta*, to show the superficial layer of muscles; drawn from the recent dissection:—*G.mx.*, gluteus maximus, its two parts; *G.md.*, gluteus medius; *B.f.*, biceps femoris; *T.v.f.*, tensor vaginæ femoris; *Sa.*, sartorius, "its vertical fibres forming a superficial rectus;" *P.c.*, panniculus carnosus; *Tr.*, trapezius; *P.*, platysma; *L.d.*, latissimus dorsi; *P.m.*, pectoralis major; *T.*, triceps; *L.h.*, levator humeri; *L.s.*, levator scapulæ; *D.*, deltoid.

Plate VI. Deeper muscles, on right side of *H. crocuta*: *G.mx.*, gluteus maximus reflected; *G.mn.<sup>1</sup>*, gluteus minimus, its two portions; *G.mn.<sup>2</sup>*, insertion of the anterior fibres of gluteus minimus; *B.f.*, biceps femoris, reflected; *G.g.*, gluteus quartus; *Sa.*, sartorius; *R.f.*, rectus femoris; *O.i.*, obturator internus and gemelli; *Q.f.*, quadratus femoris; *A.b.*, adductor brevis; *A.m.+s.m.*, adductor magnus+semimembranosus; *V.e.*, vastus externus, "hooked back;" *P.*, plantaris; *Ga.*, gastrocnemius; *F.l.d.*, flexor longus digitorum; *P.l.*, peronæus longus; *P.b.*, peronæus brevis; *E.l.d.*, extensor longus digitorum; *T.a.+E.l.h.*, tibialis anticus+extensor longus hallucis; *E.o.*, external oblique; *R.a.*, rectus abdominis; *P.c.*, panniculus carnosus, cut; *L.d.*, latissimus dorsi; *D.e.*, dorsi epitrochlearis; *T.*, triceps; *T.m.*, teres major; *S.m.*, serratus magnus; *Tr.*, trapezius, cut; *Sc.<sup>1</sup>*, *Sc.<sup>2</sup>*, scaleni; *T.c.*, transversalis cervicis, "its anterior slip;" *Sp.*, splenius; *L.s.*, levator scapulæ; *L.h.*, levator humeri; *B.a.*, brachialis anticus; *E.c.r.b.*, extensor carpi radialis brevior, "and origin of longior;" *E.c.d.*, extensor communis digitorum; *E.o.m.*, extensor ossis metacarpi pollicis; *E.m.d.*, extensor minimi digiti; *E.c.u.*, extensor carpi ulnaris; *F.c.u.*, flexor carpi ulnaris; *D.*, deltoid.

February 4, 1879.

Dr. A. Günther, F.R.S., V.P., in the Chair.

The Secretary made the following report on the additions to the Society's Menagerie during January 1879:—

The total number of registered additions to the Society's Menagerie during the month of January was 83, of which 2 were by birth, 43 by presentation, 25 by purchase, 9 received in exchange, and 4 received on deposit. The total number of departures during the same period, by death and removals, was 96.

The most noticeable additions during the month were:—

1. A Bar-winged Rail (*Rallina pœciloptera*, Hartlaub), from the Fiji Islands, purchased of the "Museum Godeffroy" of Hamburg, January 6th, new to the collection.

2. A young male Giraffe (*Camelopardalis giraffa*), received on deposit from Mr. Rice, January 27th, and intended to be purchased if it appear to be perfectly healthy. The recent death of one of the two males of this animal has rendered this proposed acquisition desirable.

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Mr. Slater read the following extract from a letter received from Prof. J. Reinhardt, F.M.Z.S., dated Zoological Museum, Copenhagen, August 2, 1876:—

"There is living at present in the Zoological Gardens of this place a Curassow which seems to deserve some attention.

"It is a '*Mitua*,' agreeing with *M. tuberosa* in possessing a crest of elongated straight feathers, which can be erected quite as in this species; but the beak is differently shaped, and more like that of *M. tomentosa*. It is, however, its colouring which exhibits the chief interest, the belly being pure white, and the tail-feathers broadly tipped with the same colour.

"I never saw such a bird before; and I have failed to find any indication of it in the literature known to me. At first I was inclined to suppose that the bird in question might be, perhaps, the female of *M. tuberosa*; but this suggestion implies that the sexual difference in this case is exactly the contrary to the general rule in the family. It also seems to be a well-established fact that the sexes are alike in the genus *Mitua*; and you yourself have given the weight of your high authority to this statement. Nor does it seem likely that the bird can be the immature or young *Mitua tuberosa*. I have at least never heard of a change of the colour of the abdomen, as a bird advances in age, from white to rufous in any of the Cracidæ. Moreover, as Natterer has collected such a large number of specimens of Curassows (and particularly not less than thirty-four of the two well-known species of *Mitua*), such a change could scarcely have escaped this most acute observer if it really



took place in these birds. Again, the bird does not seem to be a young one.

"The *Mitua* in question, was presented by a patron of our garden, and is there named '*Mitua brasiliensis*.'"

Mr. Sclater stated that the bird in question, having recently died, had been presented to the Zoological Museum of Copenhagen, and that Prof. Reinhardt had forwarded it to him for examination. Mr. Sclater then proceeded to remark on the specimen, and stated that he quite agreed with Prof. Reinhardt that it must be considered as the representative of a new and distinct species, which Prof. Reinhardt had proposed to call *Mitua salvini*<sup>1</sup>.

Prof. Reinhardt had ascertained the sex by dissection to be *female*; but the male would probably scarcely differ. The dimensions were nearly those of *M. tomentosa*; and the species should stand next to that species in Mr. Sclater's arrangement (Trans. Zool. Soc. vol. ix. p. 284), with the following differential characters:—

*Nigra purpureo nitens; ventre imo et caudæ apice albis; pilei plumis elongatis, sicut in M. tuberosa jacentibus; loris et capitis lateribus dense plumosis; rostro sicut in M. tomentosa formato sed paulo longiore et minus alto, toto rubro; pedibus rubris: long. tota circ. 2·10, alæ 15, caudæ 12·5, tarsi 4·7.*

*Obs.* Sp. ventre albo satis distincta, quoad rostrum ad *M. tomentosa*, sed quoad cristam magis ad *M. tuberosam* appropinquans.

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Mr. R. Bowdler Sharpe exhibited a series of Bulwer's Pheasants (*Lobiophasis bulweri*) from the Lawas river, N.W. Borneo, collected by Mr. W. H. Treacher, Acting Governor of Labuan. The series represented every stage of plumage of this Pheasant, and conclusively proved that *L. castaneicaudatus*, Sharpe, was the immature male of *L. bulweri*.

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The following papers were read:—

1. Notes on Points in the Anatomy of the Hoatzin (*Opisthocomus cristatus*). By A. H. GARROD, M.A., F.R.S., Prosector to the Society.

[Received December 9, 1878.]

Prof. Newton having most kindly placed in my hands for dissection three specimens of *Opisthocomus cristatus* preserved in spirit, I am able to add a few details to the accounts which have already appeared on the structure of this peculiar bird.

In his valuable paper in this Society's 'Proceedings'<sup>2</sup>, "On the Classification and Distribution of the Alectoromorphæ and Hetero-

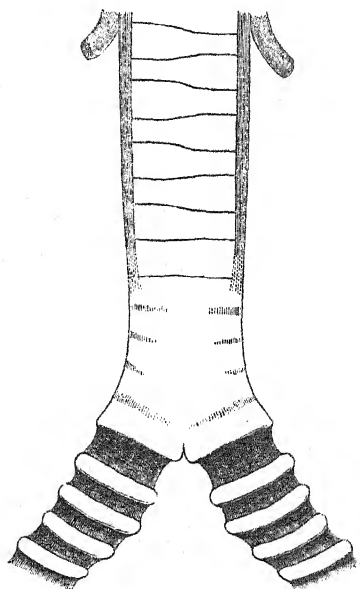
<sup>1</sup> Cf. Vid. Medd. Nat. For. i Kjöbenhavn, Jan. 8, 1879.

<sup>2</sup> P. Z. S. 1863, p. 294.

morphæ," Professor Huxley describes in detail the skeleton of *Opisthocomus*, concluding, as the result of his study of the bird, that it should constitute a group (the Heteromorphæ) by itself, which sprang direct from the main stem of Carinate descent, later than the Tinamomorphæ, Turnicomorphæ and Charadriomorphæ, but before the Gallinaceous birds, Sand-Grouse, and Pigeons were developed.

Since then, in our 'Transactions', Mr. J. B. Perrin has published a myological account of the species, in which he, however, compares it with few other birds. One of Mr. Perrin's figures<sup>2</sup> very excellently represents the form and situation of the immense crop, as

Fig. 1.



Trachea of *Opisthocomus* (front view).

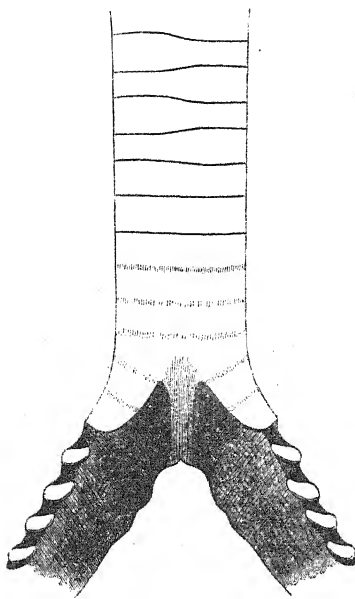
well as the situation, in the unfleshed bird, of the expanded margin of the short carina sterni, from which an accidental error made by Nitzsch, who evidently had an imperfect skin to work upon, may be corrected. Nitzsch, in his 'Pterylography,' figures (and the

<sup>1</sup> Trans. Zool. Soc. vol. ix. p. 353.

<sup>2</sup> Loc. cit. pl. lxiii. fig. 3.

drawing is reproduced in Mr. Perrin's memoir), the outline of the furcula and sternum, and does it as if the bird were not peculiar in the pectoral region. But as the crop occupies almost all the upper part of the breast, and by its magnitude distorts the furcula and sternum, the outline is quite incorrect. What is more, there is in the bird itself an oval area, about .75 inch long from above downwards, and .25 inch in breadth, of dense naked skin, covering the surface of the expanded upper cutaneous surface of the carina sterni. This is omitted in the drawing. The area surrounding this is unfeathered, although I find well-developed plumes *in the middle line* above it,

Fig. 2.

Trachea of *Opisthocomus* (back view).

and no trace of any longitudinal median space of any kind over the surface of the crop or neck.

*Opisthocomus* is one of those birds in which the pterylosis is not so decisive of its affinities as in many cases, the reason being that so great an amount of the unfeathered spaces is protected by semi-plumes. May not these semiplumes in many instances be degenerated feathers? This question has never been decided, so far as I am aware.

To our knowledge of the osteology of the Hoatzin I have no fresh

facts to add. I may, however, mention that it is only in the Cramidae, among allied birds, that the vomer runs so far forward in the palate at the same time that it is tumified at its anterior extremity. In *Ortalis albiventris* this is most strikingly the case.

The alimentary canal has been so fully described by L'Herminier<sup>1</sup>, that it is quite unnecessary for me to enter into detail with reference to it.

Johannes Müller<sup>2</sup> has noted one or two points concerning the windpipe. Figs. 1 and 2 (pp. 110, 111) represent its anterior and posterior aspects. The lowermost four tracheal rings are consolidated together, and the first pair of bronchial semirings with them, to form a box-like three-way piece, the pessulus posteriorly running up to join the middle of the penultimate ring. The second pair of bronchial semirings does not articulate with the first, they in all respects resembling those nearer the lungs.

It is possible that what is above considered to be the first pair of bronchial semirings may be the last tracheal ring. That there is a small notch interrupting the continuity of the inferior mid-anterior margin of the tube formed by the consolidated rings, and that the ring above the lowest segment of the consolidated tube is incomplete behind, are, however, facts in favour of the former view.

Among the Gallinæ the only genera which at all approach *Opisthocomus*, as far as the lower larynx is concerned, are those of the Megapodidæ.

The two carotid arteries of *Opisthocomus*, where they meet in the front of the neck, become bound together much more intimately than in most birds, although at the part where it is impossible to dissect away the one vessel from the other, a cross section proves that the two tubes are still quite separate.

Myologically, the great gluteus (tensor fasciæ of my earlier papers) completely covers the biceps cruris superficially. The fifth gluteus, which runs from the ilium a short distance behind the acetabulum, and covers with its triangular tendon the trochanter of the femur, is present, but small. The semitendinosus and its accessorius are both large, as are the femoro-caudal and its accessorius. The myological formula<sup>3</sup>, as far as these muscles are concerned, is therefore AB XY. The ambiens muscle is present and small; but its slender tendon, in every case but one of the six knees I have examined, is lost upon the capsule of the front of the knee. In the one instance it traversed the fibrous tissues of the quadratus-tendon, as in other birds when it is present, to join the digital flexors in the back of the leg. A similar imperfection in the development of the ambiens is sometimes found in *Sula bassana*, *Stringops habroptilus*, and in the species of the genus *Ædicnemus*. The obturator internus is triangular in shape, as in the Gallinæ.

In the deep tendons of the foot, the flexor hallucis longus sends a

<sup>1</sup> Comptes Rendus de l'Acad. des Sciences, 1837, vol. v. p. 435.

<sup>2</sup> Berichte Akad. d. Wissenschaft. z. Berlin, 1841, p. 177.

<sup>3</sup> Vide P. Z. S. 1874, p. 111.

strong vinculum downwards to that of the flexor digitorum profundus before it runs on to supply the hallux itself<sup>1</sup>. The determination of this point the late Prof. C. J. Sundevall much desired<sup>2</sup>, as in the only specimen he had the opportunity of examining, and that imperfectly, the apparent absence of the vinculum favoured its Passerine affinities. As, however, is stated above, the vinculum is present and large in the individuals dissected by myself.

In the upper limb, the great pectoral muscle is much reduced at its furcular and manubrial origins, over which the crop is placed. It is thicker lower down. The fibres of the second pectoral descend as far as the lower margin of the sternum; and there is a small third pectoral covered by it, as in all Gallinæ, although in *Opisthocomus* it is reduced in size. The biceps humeri muscle sends a peculiarly large fasciculus to the tendon of the tensor patagii longus, which reaches it opposite the middle of the patagium<sup>3</sup>. This slip I never find developed in the Cracidae; but it is present in the closely allied Megapodidae, and in all the other Gallinaceous birds.

The above-mentioned myological facts throw some light on the affinities of *Opisthocomus*. The presence of two carotid arteries, an ambiens muscle, an accessory femoro-caudal, and a deep plantar vinculum place its non-passerine nature beyond a doubt. Adding the tufted oil-gland and the inch-long colic cæca, the bird could only be related to the Tinamidæ, Gallinæ, or Rallidæ, from which it will be remembered the Cuculidæ differ in that they lack the oil-gland tuft, and the Musophagidæ in that they have no colic cæca. *Opisthocomus*, being holorhinal<sup>4</sup>, can have nothing to do with the Charadriiform birds. In the Rallidæ there is only a single posterior notch on each side of the carina sterni, at the same time that a crop is never developed. These features, when correlated with the peculiarities of the palate, remove them from the necessity of further consideration.

*Opisthocomus* must therefore, from what has been just shown, be a Gallinaceous bird, or form a group by itself. As there is no Gallinaceous bird without a direct articulation between the pterygoid bones and the basisphenoidal rostrum, it is hardly possible to include the Hoatzin along with them; and yet it resembles them most closely, as it does the Cuculidæ, in the length of its colic cæca and the number of its rectrices. It is not far removed from the Musophagidæ as well. All these facts can be expressed as follows:—

<sup>1</sup> *Vide* P. Z. S. 1875, p. 341.

<sup>2</sup> *Methodi Naturalis Avium dispendiarum Tentamen*. Stockholm, 1873, p. 156.

<sup>3</sup> *Vide* P. Z. S. 1876, pp. 195, 199.

<sup>4</sup> P. Z. S. 1873, p. 33.

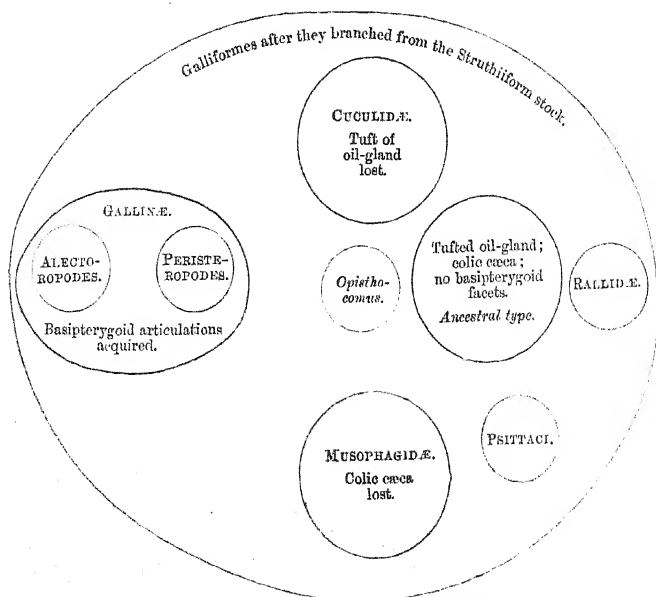


Diagram to show position of *Opisthocomus*.

This diagram indicates that the Galliform ancestor, besides giving rise to the at this moment irrelevant Rallidæ and Psittaci, varied also in a strictly Gallinaceous direction, the ancestor of *Opisthocomus* leaving the parent stem very shortly before the true Gallinæ first appeared, and at about the same time as the independent pedigree of the Cuculidæ and Musophagidæ commenced. That the Musophagidæ and the Cuculidæ are very closely related to the Gallinæ is proved by facts brought forward by me in an earlier paper<sup>1</sup>; and the anatomy of the Hoatzin seems to still further favour this hypothesis, by showing that there exists a bird which helps to fill the gaps between them.

2. On the Breeding of the Argus Pheasant and other Phasianidæ in the Society's Gardens. By P. L. SCLATER, M.A., Ph.D., F.R.S., Secretary to the Society.

[Received December 11, 1878.]

(Plates VII. & VIII.)

Although the hopes entertained some twenty years ago of establishing the whole of the Indian Phasianidæ as permanent denizens in our aviaries<sup>2</sup> have been disappointed, and some of the species

<sup>1</sup> P. Z. S. 1874, p. 121.

<sup>2</sup> Cf. Mitchell, P. Z. S. 1858, p. 554.

originally introduced have become almost extinct in Europe<sup>1</sup>, we have nevertheless succeeded of late years in breeding two or three other more recently acquired species, concerning which I have a few remarks to offer to the Society, principally as an introduction to the valuable notes which our head keeper, Mr. Benjamin Misselbrook, who has for many years had the breeding Gallinaceous birds under his care, has at my request drawn up upon this subject.

### 1. THE ARGUS PHEASANT (*Argus giganteus*).

The first birds of this species possessed by the Society were two cocks, presented by Mr. J. G. Fanshawe, F.Z.S., in May 1872. Mr. Fanshawe informs me that these birds were sent to him by Mr. Arthur N. Birch, F.Z.S., late Colonial Secretary at Singapore, where Argus Pheasants are frequently brought to market alive. The birds are caught by the natives in springes in the jungles, tied up in palm-leaves, so as to be prevented from knocking themselves about, and brought to market alive, the weather being so hot that the birds cannot be conveyed when dead, so as to be useful for food. Thus obtained they are frequently placed in aviaries, where they soon become tame, and are killed when they are required for the table. It was from some of the tame stocks in the aviaries that Mr. Fanshawe's birds were derived.

In July 1873 Sir Harry Ord, Governor of the Straits Settlements, presented us with two hen Argus Pheasants, probably derived from the same source; and we thus became possessed of two perfect pairs of this bird. Before the commencement of the last breeding-season we had lost one of our cock birds; but there still remained in the Gardens, besides the other cock and the two hens above mentioned, a third hen, received on deposit in 1873. I subjoin Mr. Misselbrook's report on the breeding of these birds during the season of 1878.

#### *Report on the Argus Pheasants, 1878.* By B. MISSELBROOK.

This season there were four adult examples of the Argus Pheasant in the Gardens, one cock and three hens. The hens were placed in adjoining compartments, and the cock shifted from one to the other about every alternate day.

Hen number one laid two eggs, one on March the 7th and one on March the 9th. As she did not seem inclined to sit herself, I placed these eggs under a bantam hen. After thirty days, no young birds appearing, the eggs were taken away, when one of them was found to contain a dead bird, and the other was addled.

Hen number two laid two eggs, one on May 27th, the other on May 29th. These eggs were also put under a bantam hen; and after twenty-four days' sitting two birds were hatched. Both these did very well for five weeks, when they were attacked with worm in the windpipe; and both, unfortunately, died.

<sup>1</sup> The Impeyan (*Lophophorus impeyanus*) has not bred with us since 1871, and has, I believe, likewise failed on the Continent. The Crossoptilon (*Crossoptilon mantchuricum*) and the Cheer (*Phasianus wallichii*) have both become scarce; and others (e.g. *Ph. sammerringi* and *Cerionis satyra*) seem to have been altogether lost.

Hen number three laid two eggs. These were put under a hen ; and one bird was hatched, the other egg being addled. This bird also lived for five weeks, and then died.

Hen number two laid a second sitting of two eggs. These she sat upon herself ; but both were addled.

Hen number one laid a second sitting of two eggs, and began to sit on them on July 9th. On the 2nd of August two birds were hatched. This shows the time of incubation to be twenty-four days. The male took no part in the incubation.

I am glad to say that I have succeeded in rearing these two birds up to the present time, and that both are doing well, and are, I hope, out of danger, as they are now nearly three months old. I find the habits of these birds as near as possible those of the Peacock Pheasant (*Polyplectron*). The faculty of flying begins very early, the young being able after four or five days to mount a high perch, and so to roost under the large wings of the parent bird. The difference in the sex of the young birds is shown by the males being much larger than the females, and also of a brighter colour.

As will be seen by these notes, the three hens have laid altogether ten eggs. Two have laid four each, and one bird two eggs. Five eggs were bad ; and five birds were hatched, of which three died, and the other two are now living in the Gardens.

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I am glad to be able to add that the two young Argus Pheasants hatched last year are still thriving, and show every prospect of being likely to attain maturity. This is the more gratifying, as none of the continental gardens or amateurs, I believe, have yet succeeded in breeding this bird. M. Vekemans, of Antwerp, who has been so successful with most of the Phasianidæ, writes me that though he has succeeded in hatching the eggs, he has never been able to rear the young birds.

I exhibit a skin of a chick of the Argus Pheasant (Plate VII.) which was hatched in our gardens in July last, and died when about thirty-five days old ; also some eggs of this species.

The egg (Plate VIII. fig. 1) is of a rich coffee-colour, finely punctured throughout, with a darker blotch at the large end. It measures about 2·6 by 1·9 inches.

## 2. THE PEACOCK PHEASANT (*Polyplectron chinquis*).

Males of this species were introduced into our gardens in 1857 ; but no females were received until 1864. The birds paired and began to breed in 1866, and have continued to do so nearly every year until the present time.

Unlike most of the Phasianidæ in captivity, the Polyplectrons pair, and it is not practicable to keep one male for several hens. Mr. Misselbrook has furnished me with the following notes on the reproduction of this species.

### *Report on the Polyplectrons.* By B. MISSELBROOK.

The Polyplectrons pair and begin to breed in the second year of



their age. The hen lays two eggs only at a sitting, and begins to sit at once; but if the first two eggs are removed and placed under a bantam hen for hatching, in about a month or six weeks she lays two more eggs. These second two I have usually allowed her to sit on herself. The time of her sitting is twenty-one days.

In the laying of two eggs only at a sitting the Peacock Pheasant resembles the Argus.

The young Polyplectrons are not so strong as the young of the Argus: the young of the Argus are able to mount a high perch in a few days; but the young Polyplectrons are not able to do so until they are a month or six weeks old.

The male Polyplectron takes no part in sitting or charge of the young birds.

It is difficult to distinguish the sex of the young Polyplectrons until they are six or seven months old; by that time the males are seen to be a little larger than the females. They are also a little lighter in colour, and have a lighter-coloured eye.

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The egg of the *Polyplectron chinquis* (Plate VIII. fig. 2) is more like those of the true Pheasants, being of a uniform pale stone-colour, and measuring about 2.0 inches by 1.45.

### 3. THE TEMMINCK'S TRAGOPAN (*Ceriornis temmincki*).

Males of this Tragopan were acquired in 1864 and 1866; and in 1867 we acquired our first female. The first young birds were hatched in May 1869. The following are our head keeper's notes on the mode of incubation.

#### *Report on the Temminck's Tragopan.* By B. MISSELBROOK.

The old birds begin to lay early in April, and lay seven or eight eggs; they make their nest, if possible, off the ground. I therefore used always to place an open box for the hens to lay in, which box they readily take to, and, after laying the usual complement of eggs, begin to sit and hatch out young birds. The male bird at times takes a share in sitting on the eggs. The period of incubation is twenty-eight days.

The young birds are not so strong as the young Argus, and they are not able to fly until they are four or five weeks old. At that time they will mount a perch along with the parent bird, and, if allowed, would roost outside along with the old bird for the night.

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The egg of *Ceriornis temmincki* (Plate VIII. fig. 3) is of a clear buff-colour freckled with reddish spots, and measures 2.05 inches by about 1.6.

### 4. THE HORNED TRAGOPAN (*Ceriornis satyra*).

Of this species we received our first specimens from the Babu Rajendra Mullick in 1863<sup>1</sup>. They bred the same year, and again in 1865, after which we, unfortunately, lost most of our stock.

<sup>1</sup> See P. Z. S. 1863, p. 104.

In 1876, July 24th, a pair of these birds were presented to the Society by H.R.H. the Prince of Wales. The female died; but another female (received in exchange, July 17, 1877) laid three eggs in April 1878. These eggs were placed under a common Hen; and two young birds were hatched, which are now living in the gardens.

Mr. Misselbrook reports that the period of incubation in *C. satyra* is the same as in the other species, viz. twenty-eight days, and remarks that he has never seen the male of this species take part in the sitting. Otherwise its habits are similar to those of *C. temmincki*. He adds that all Tragopans, both young and old, are great grass-eaters, and are also fond of dried fruits, such as currants, raisins, &c., and all kinds of wild berries, such as hawthorn-berries, privet-berries, and ripe elder-berries.

The egg of *C. satyra* (Plate VIII. fig. 4) resembles that of *C. temmincki*, but is considerably larger, measuring nearly 2·7 inches by 1·6.

#### 5. THE MANTCHURIAN CROSSOPTILON (*Crossoptilon mantchuricum*).

We received our first examples of this fine bird in July 1866<sup>1</sup>. They were both males; but females were obtained from the Jardin d'Acclimatation of Paris later in the same year. They bred in 1867 and 1868, but have not thriven with us since that period.

Mr. Misselbrook has supplied me with the following notes on this species:—

“The males and females of the Crossoptilon are the same in colour and appearance when young, and it is not easy to distinguish the sexes. In the adult birds the males are recognizable from being furnished with a small blunt spur, whereas the females have none.

“The hens lay from twelve to sixteen eggs each at a sitting, the time of incubation being about twenty-eight or thirty days. I say twenty-eight or thirty days, as I have known the time to vary one or two days in the time of sitting.

“I have not seen the males take any part in the incubation.

“The great peculiarity in the young of these birds being their exceeding tameness; there is not the least shyness about them, they being more like the domesticated chicken.”

The egg of the Crossoptilon (Plate VIII. fig. 5) is of a uniform pale stone-colour, and measures about 2·3 inches by 1·7.

#### EXPLANATION OF THE PLATES.

##### PLATE VII.

Chick (male) of *Argus giganteus*, from an example which died on 25th August, 1878.

##### PLATE VIII.

- Fig. 1. Egg of *Argus giganteus*.  
 2. Egg of *Polyplectron chinquis*.  
 3. Egg of *Cerionis temmincki*.  
 4. Egg of *Cerionis satyra*.  
 5. Egg of *Crossoptilon mantchuricum*.

<sup>1</sup> See P. Z. S. 1866, p. 418.

3. On a new Genus and Species of Spiders of the Family  
*Salticides*. By the Rev. O. P. CAMBRIDGE, M.A.,  
 C.M.Z.S.

[Received December 17, 1878.]

Some few months ago, Mr. Charles Darwin very kindly forwarded to me two pretty little silken nests of a Spider of the family *Salticides*, formed on the upper surface of the leaves of, apparently, some shrub or herbaceous plant, and received a short time previously from Herr Fritz Müller of Blumenau, Sta. Catherina, Brazil. More recently, in answer to a letter written to him by myself, asking for information about the maker of these little nests, Herr Müller has most obligingly and promptly sent me two more, together with several of the Spiders by which they are constructed. All the Spiders are females, and all, excepting one, immature. The nests are remarkable from their form, and from the exactly similar size and shape of all the four that have come under my notice; they also appear to be, as Herr Müller tells me, invariably formed on the midrib of the upper side of the leaf. The accompanying figure (p. 120) will give a good idea of this curious little three-entranced domicile.

There is nothing particularly remarkable in the appearance of the Spider. It is, however, interesting in respect of the generic details of its structure; for although it bears a strong affinity to several European genera of *Salticides* (*Menemerus*, Sim., *Marpessa*, C. L. Koch, *Hyctia*, Sim., and *Icius* ejusd.), I am unable to get it satisfactorily into any of them; I have therefore characterized a new genus for its reception.

Herr Müller tells me that he finds the nests of this Spider on the leaves of various plants.

FAM. SALTICIDES.

FRITZIA, g. n.

*Cephalothorax* longer than broad, the length being about half as much again as the breadth; upper surface perfectly flat; depth moderate; hinder slope short and very abrupt. Ocular area rectangular, considerably broader than long (the length being no more than half the breadth), and scarcely more than one third the length of the cephalothorax.

*Eyes* of foremost row very unequal in size, separated by rather considerable intervals, those of middle row nearer to the foremost than to the hinder row.

*Legs* short, moderate in strength, relative length apparently 1, 4, 2, 3, the actual difference between 1, 4 and 2, 3 respectively being very small; those of first pair much the strongest. Spines beneath metatarsi and tibiæ of first and second pairs; those of first pair long and strong.

*Abdomen* short oval, and of a somewhat flattened form.

*Fritzia muelleri*, sp. n.

Length of the adult female  $1\frac{3}{4}$  line.

*Cephalothorax* deep blackish brown, the ocular area being black ; it has a narrow submarginal line of white hairs ; and its whole upper surface is thinly clothed with similar hairs.

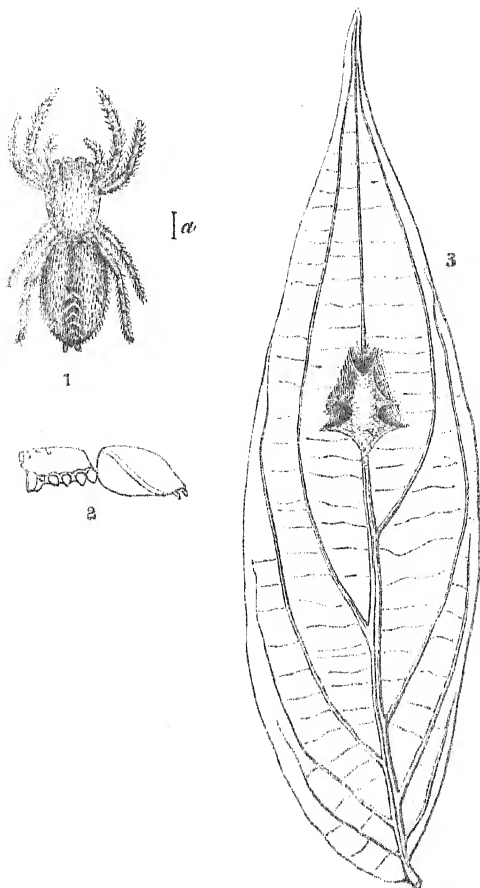


Fig. 1. Spider enlarged. a. Natural length of Spider.

2. Ditto, in profile, without legs or palpi.

3. Leaf of plant with nest on midrib (natural size).

*Falces* small, set rather back beneath the fore margin of the cephalothorax, nearly vertical, and of a dark-brown hue.

*Maxillæ* and *labium* dull brownish, tipped with a paler colour.

*Sternum* oval, pointed behind, and similar in colour to the cephalothorax.

*Legs* pale dull yellowish, the femora being dark brown, and the tibiæ, metatarsi, and tarsi marked with brown, giving them a somewhat annulated appearance; beneath the terminal claws is a small claw-tuft.

The *palpi* are short, and of a more uniform pale-yellowish colour, clothed with, among others, some pale scale-like hairs above; while the digital joints have numerous longer, blackish ones beneath.

*Abdomen* short-oval, and of dark maroon-brown colour, thinly clothed with short, pale grey, or whitish, rather shining, somewhat squamose hairs; an indistinct pale stripe runs obliquely from just beneath each side of the fore extremity to, or towards, the spinners; the central longitudinal line is broadly blackish, but not very distinctly defined; and there are, on its hinder part, some very indistinct paler, sharply angular lines in a longitudinal series; on the underside is a broad, longitudinal, central blackish band, somewhat narrowing to the spinners.

*Hab.* Blumenau, Sta. Catherina, Brazil. On the leaves of various herbaceous plants, in little three-entranced, white, silken nests.

#### 4. On the Attachment of the Eye-Muscles in Mammals.

—I. *Quadrumanæ*. By W. OTTLEY, M.B., F.R.C.S., Demonstrator of Anatomy at University College, London.

[Received January 1, 1879.]

During the last six months I have been enabled, by the kind permission of Mr. Garrod, to examine the attachment of the eye-muscles to the sclerotic in a large number of the *Mammalia*. In some orders my observations have been as yet too few to enable me to generalize from them; but in the *Quadrumanæ*, where there has been a larger amount of material at my disposal, the variations in these muscles appear to be sufficiently well marked and characteristic to deserve a short record.

As a preliminary, I may state that, from the observations of Profs. Donders, Helmholtz, and others, it has been established that in man the six muscles are combined in the following manner:—

In turning the eye up, the superior rectus and inferior oblique act; in turning it down, the inferior rectus and superior oblique; directly inwards, the internal rectus; directly outwards, the external rectus.

In any intermediate position three muscles are used, thus:—

In turning the eye up and in, the superior and internal recti and inferior oblique; in turning it up and out, the superior and external recti and the inferior oblique; and so for the other movements.

The action of the individual muscles may be thus stated :—

The superior rectus (3)	turns the eye up and in,
inferior rectus (3)	„ down and in,
internal rectus (3)	„ in,
external rectus (6)	„ out,
superior oblique (4)	„ down and out,
inferior oblique (3)	„ up and out ;

the numbers indicating the nerves which supply them.

It is also believed that a very slight rotation of the eye round an

Fig. 1.

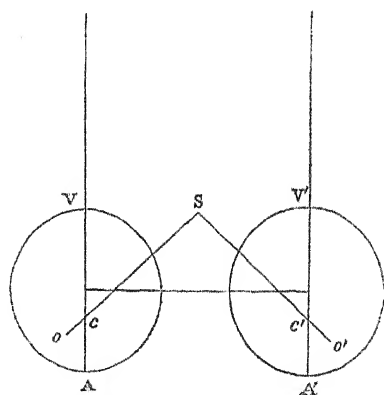
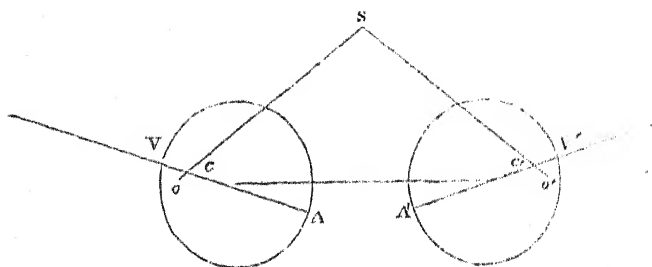


Fig. 2.



antero-posterior axis (the visual axis) does normally occur (Donders, *Ann. d'Oculistique*, 1877).

On examining the eye of a fish it is at once evident that the muscles here cannot have the same action as in the human eye. It is seen that here the superior oblique, which has no pulley, must be com-

bined, not with the inferior, but with the superior rectus; and the same disposition is found in all the Reptiles and Birds that I have examined. Not only so, but in some Mammalia, particularly those in which the eyes are placed at the side of the head, as in the Rodents and others, the muscles must be combined as they are in the fish or bird.

Professor Struthers, in a paper on the action of the oblique muscles (Monthly J. of Med. Science, Oct. 1849), has already drawn attention to the differences in the direction of these muscles which are found in the Mammalia, and has pointed out that the more the eyes are directed outwards, the more does the angle which the superior oblique makes with the visual axis tend to become acute.

The accompanying diagrams will explain this change in the angle.

Fig. 1 represents the visual axes VA VA' parallel as in man; SO SO' the direction of the superior oblique; the angle S c A is obtuse. In fig. 2 the axes are divergent, as in the Rabbit: the letters correspond; the angle S c A is acute. It will be noticed also that SO SO' are directed to the front of the eye instead of to the back. This forward position of the superior oblique muscle, however, as will be presently shown, is not peculiar to those animals in which the eyes diverge.

Among the Quadrumana I have examined the attachment of the eye-muscles in the following genera and species:—

Fam. Simiidae.—*Simia satyrus*.

Fam. Cercopithecidae.—*Semnopithecus leucoprymnus*, *Cercopithecus callitrichus*, *C. albicularis*, *Cercocebus fuliginosus*, *Macacus inuus*, *Cynocephalus porcarius*.

Fam. Cebidae.—*Ateles ater* and *A. melanochir*, *Mycetes seniculus*, *Cebus capucinus*, *C. hypoleucus*, *Nyctipithecus felinus*, *Saimaris sciurea*.

Fam. Hapalidae.—*Hapale penicillata*, *Midas rosalia*.

And in the Lemures, fam. Lemuridae, *Lemur*, sp.?; fam. Nycticebidae, *Nycticebus tardigradus*.

In the human eye my observations agree with Sappey's description rather than with that of Henle; and I therefore give the measurements to be found in Sappey's 'Anatomie Descriptive,' and a diagram, to serve as a standard of reference.

The superior rectus is inserted  $\frac{8}{25}$  inch from corneal edge. It is curved; and its outer is further from the cornea than is its inner edge.

The inferior rectus at a distance of  $\frac{6}{25}$ . (It is also oblique like the superior.)

The external rectus  $\frac{7}{25}$ .

The internal or median rectus  $\frac{5}{25}$  to  $\frac{6}{25}$ .

The superior oblique  $\frac{10}{25}$  (I should rather say  $\frac{8}{25}$ ) from the optic nerve.

The inferior oblique  $\frac{3}{25}$  from the nerve-entrance. The line of its insertion, if prolonged, would meet the optic nerve.

Neither of these authors refers to the curvature of the line of insertion of the superior oblique.

In *Simia satyrus* it will be seen that the attachments resemble

those described already, with the exception that the recti are placed further forwards.

The superior, inferior, and external recti are  $\frac{5}{25}$  from the corneal edge. The median is rather nearer,  $\frac{4}{24}$  inch.

Fig. 3.

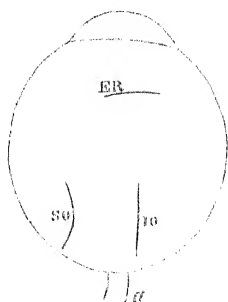


Fig. 4.

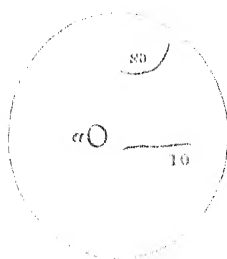


Fig. 3. A diagram of the attachments of the superior oblique, inferior oblique, and external rectus in the human eye, from the outer side.

Fig. 4. A diagram of the insertions of the superior and inferior oblique in the human eye, from behind: a, optic nerve.

The superior oblique is curved, but generally parallel to the optic nerve; anterior border  $\frac{1}{20}$  from cornea, posterior  $\frac{6}{20}$  from optic nerve.

Fig. 5.

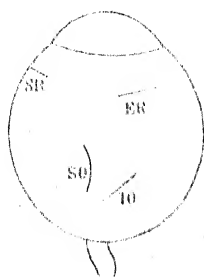


Fig. 6.

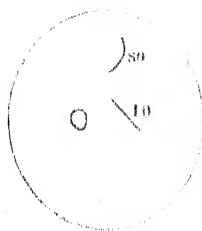


Fig. 5. A diagram of the attachments in *Simia satyrus*, from the outer side.

Fig. 6. From behind, to show the relative positions of the obliqui and the optic-nerve entrance.

The inferior oblique is higher at its inner extremity, which is  $\frac{5}{25}$  from the optic nerve.

The optic-nerve entrance is  $\frac{1}{4}$  inch nearer the inner than the outer edge of the cornea.



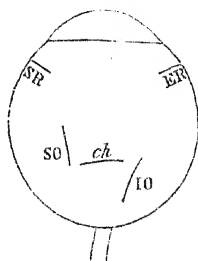
There is no choanoid muscle<sup>1</sup>; and the obliquity of the inferior oblique is remarkable.

In all the Cercopithecidæ, as, indeed, in all the Old-World Monkeys below the Simiidæ, there is a representative of the choanoid muscle, in the shape of a larger or smaller muscular slip, inserted between the superior and inferior oblique. In *Semnopithecus leucoprymnus* this slip was very small, the fibres were fattily degenerated, and no striæ were perceptible; but, at the same time, the atrophied remains were distinctly recognizable. In *Cercopithecus callitrichus* the muscle was even less distinct; there was nothing but a thin fibrous sheet, quite isolated from the capsule enclosing the sclerotic, it is true, and with an insertion corresponding to that of the choanoid slip in other members of this group; but microscopically no muscular fibres were found, only vessels and fibrous tissue remained.

In *C. albigularis* the slip was larger and contained distinctly striated muscular fibre, as also in *Cercocebus fuliginosus*. In *Macacus innuus* and *Cynocephalus porcarinus* this muscular band was larger and very evident.

The differences between these members of the group with respect

Fig. 7.



A diagram of the attachments in *Macacus innuus*, from above and outside; shows the relative positions of the oblique muscles to one another and to the choanoid.

to the other muscles were slight. In all, the outer borders of the superior and inferior recti were posterior to the inner borders, while the median rectus was slightly nearer to the cornea than the external (as a rule).

In all, the anterior edge of the superior oblique was more distant from the cornea than was the posterior from the optic nerve, while the inferior oblique remained near the back of the eye. The optic-nerve entrance was always internal to the visual axis.

In the Cebidæ and Hapalidæ we have an important difference. The choanoid slip is entirely absent; even in the Marmosets I could

<sup>1</sup> This muscle, very seldom absent in the Mammalia, arises on the outer side of the optic nerve, is inserted into the sclerotic behind the recti, and is supplied by the sixth nerve; but its size and its attachment to the sclerotic vary much.

find no trace of it ; but the superior oblique has now moved forward so as to be inserted close behind the superior rectus ; while the inferior oblique still remains near the optic nerve, which still enters on the inner side of the fundus, though in *Hapale penicillata* it is only  $\frac{1}{16}$  inch nearer to the inner than to the outer border of the cornea.

Fig. 8.

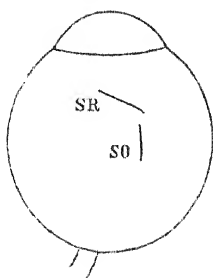


Fig. 9.

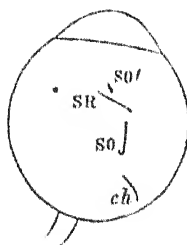


Fig. 8 is a diagram, seen from above, of the attachments of the superior oblique and superior rectus in *Mycetes seniculus*.

Fig. 9. Ditto in *Hapale penicillata*.

In the Cebidæ the rectus and obliquus are inserted almost at right angles with one another (in *Cebus* the superior oblique is quite at right angles to the superior rectus); while in *Hapale penicillata* and *Midas rosalia* the superior rectus is so oblique as to approach

Fig. 10.



A diagram, from above, of the eye of a Lemur ; indicates the relations of the choanoid, superior oblique, and superior rectus.

the direction of the superior oblique ; in these also the external rectus is very convex forwards.

There is no tapetum in any of the Quadrumana that have been examined.

In the Lemures the choanoid appears again as a distinctly muscular slip with the same relative attachment.

The superior oblique keeps its anterior position, the posterior border being nearly twice as far from the optic nerve as the anterior is from the cornea.

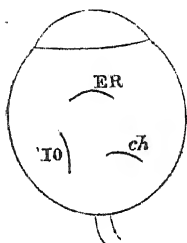
The inferior oblique has also moved forwards, so that in *Nycticebus* its posterior border is  $\frac{3}{16}$  from the optic nerve, while its anterior is  $\frac{5}{16}$  from the cornea. (In the Cebidæ it is often five times nearer to the optic nerve than it is to the cornea.)

In *Lemur* some fibres of the superior oblique are inserted in front of the superior rectus (*so'* in diagram).

The optic nerve is considerably to the inner side of the fundus.

In *Nycticebus* there is a further peculiarity in the superior oblique, in that it pierces the tendon of the superior rectus near its inner border to be inserted behind it.

Fig. 11.



A diagram, from the outer side, of the eye of *Nycticebus*; shows that the inferior oblique has moved further forwards.

The following summary therefore appears to be true :—

a. In the higher Quadrumana the muscles closely resemble the human muscles in their attachments, and, as was already known, there is no choanoid muscle.

b. In the Cercopithecidæ, besides other points of difference, there is always some representative of the choanoid. It is interesting to observe that in the higher families the muscle which may be supposed to be ceasing to be useful becomes degenerated and, at last, almost unrecognizable.

c. In the Cebidæ no trace of choanoid remains, but the superior oblique has moved forwards.

d. In the Hapalidæ the superior oblique has moved still further forwards, and changed its relation to the superior rectus, while the optic nerve has also moved outwards.

e. In the Lemuridæ the choanoid is again distinctly present, but the superior oblique has a different relation to the superior rectus, and either pierces it or is attached partly in front of it, while the inferior oblique is also moved forwards.

I may add that in a Bat (*Pteropus medius*) I found the superior oblique to have a relation like that in the Lemur to the superior rectus, but the inferior oblique was close up to the corneal limit.

It may be also proper to state that these variations in the muscular attachments do not appear to depend in any definite manner on alterations in the position of the orbit. M. Broca, in the 'Revue d'Anthropologie,' 1877, p. 356, gives a table of the obliquity of the orbit in members of the Quadrumana, this obliquity being determined by measuring the angle between the base-line of the skull (in his series the base-line chosen is the plane of the foramen magnum) and the axis of the orbit. This axis is a line passing outwards and forwards from the optic foramen through the centre of the orbital aperture. From this direction of the axis it will be seen (*a*) that it does not correspond with the visual axis, (*b*) that its obliquity is made up of an obliquity to the median plane of the head and of an obliquity to the horizontal base-line of the skull.

As instances of the great varieties found in this angle, he gives the mean angle in Orang as  $45^{\circ}62$ , *Cercopithecus*  $28^{\circ}43$ , *Cebus*  $22^{\circ}3$ , *Myeetes*  $67^{\circ}17$ , Lemurs  $41^{\circ}05$ .

It seems possible that a comparison of the angles between the two visual axes when the eyes are at rest, would be more likely to afford some explanation of the meaning of the gradual change in the relative position of the eye-muscles; and the direction of these axes it appears at present to be impossible accurately to ascertain.

## 5. On some Birds transmitted from the Samoan Islands by the Rev. T. Powell. By OSBERT SALVIN, M.A., F.R.S.

[Received January 6, 1879.]

The collection, which contained specimens of the following five species of birds, was placed in my hands by Mr. Selater, because there were two Petrels amongst them, a family of birds to which I have lately paid considerable attention. The skins were obtained by the Rev. Thomas Powell, of Faleatili, Upolu, Samoan Islands, during a visit to the islands of Tutuila and Manoa, the two easternmost islands of the group, and transmitted to Mr. Selater, with a request that he would have them named. This I have endeavoured to do, but have only succeeded in finding names for three of the five species, the other two being apparently undescribed:—

### 1. PINAROLESTES POWELLI, sp. nov.

*Saturate brunneus, alis et cauda nigricantioribus; abdomine rufescenti-brunneo; rectricibus tribus utrinque extimis albo terminatis; rostro et pedibus plumbeo-corneis. Long. tot. 7.0, alae 3.1, caudae 3.2, tarsi 0.9, rostri a rectu 1.1.*

*Hab.* Tutuila, Samoan Islands (*T. Powell*).

*Obs.* Sp. *P. vitiensis* affinis, sed major, alis et cauda saturatius brunneis.

This bird, for which I have been unable to find a name, belongs to the small section of this genus the members of which have white tips to the lateral tail-feathers. It certainly comes nearest the Fijian *P. vitiensis*, with the British-Museum specimens of which I have compared it. *P. heinii* is another allied species, but is still smaller than *P. vitiensis*, besides differing in other respects (*cf.* Sharpe, Cat. B. iii. p. 293 *et seq.*). Dr. Finsch and Mr. Sharpe, both of whom are conversant with the members of this genus, on examining this skin pronounced it to belong to an undescribed species. No *Pinarolestes* has hitherto been recorded from the Samoan Islands.

The type of this species, which I propose to dedicate to its discoverer, has been deposited in the British Museum.

Mr. Powell's letter gives the following account of this species:—

"Vernac. name, '*Sagaolevas*' (Sá-ngă-o-le-vás). A small agile bird. Length 7" from the point of the beak to the tip of the tail, wings rather longer than the body. Tail long, spreading. Feathers of the head, back, wings, and tail brownish black; the three outer tail-feathers on each side tipped with white; throat, breast, and belly brownish slate; sides brownish. Head large; feathers of the head erect. Appearance fierce; voice harsh. Beak long, strong; and slightly notched at the tip, furnished with bristles at the base; nostrils near the base, round, slanting backwards; gape wide. Tongue cartilaginous at the tip. Tarsi about 1" long. Toes, inner and outer nearly of a length, shorter than the middle, the hinder one of which is rather longer and stronger than the front one. Grasp strong.

"*Habits.* This bird flies round and round persons coming into its vicinity, keeping up a continual harsh cry, which the natives call scolding; it nevertheless keeps well out of arm's length, and dodges well. A native fired twenty times, and failed to get a specimen."

## 2. HALCYON SACRA.

*Halcyon sacra* (Gm.); Sharpe, Mon. Alced. p. 223, pl. 85.

*Hab.* Tutuila, Samoan Islands (*T. Powell*).

The specimen sent agrees accurately with the central figure in Mr. Sharpe's plate, which was drawn from a specimen said to have come from Tongataboo. Mr. Sharpe unites the birds from the Fiji, Friendly, and Samoan islands; and I follow him in so doing; but should the Samoan bird prove distinct, the name it should bear is *Halcyon pealii*, Finsch & Hartl. Orn. Centralpolyn. p. 38, it being the *Dacelo coronata*, Peale (*nec Müller*).

## 3. ANOUS CÆRULEUS.

*Sterna cærulea*, Bennett, Narr. Whaling Voy. ii. p. 248.

*Anous cæruleus*, Sharpe, P. Z. S. 1878, p. 272.

*Hab.* Tutuila, Samoan Islands (*T. Powell*).

The full synonymy of this species is given in Mr. Sharpe's Notes on Birds from the Ellice Islands (*l. c.*). Mr. Powell gives the total length as 10 inches, and the expanse of the wings as 20 inches. The native name in Samoa is "Laia." He says the bird is abundant in some parts of Tutuila.

4. *FREGETTA MÆSTISSIMA*, sp. n.

*Omnino fuliginoso-nigrescens, alis et cauda nigricantioribus; alis longissimis, cauda valde furcata; rectricibus latissimis; tarsis elongatis; digitis fere æqualibus, phalangibus proximis complanatis. Long. tota 9·5, alæ 9·1, caudæ rectr. med. 3·2, lat. 4·2, tarsi 1·9, dig. med. cum ungue 1·3, rostri a rictu 0·9.*

*Hab.* Samoan Islands (*T. Powell*).

*Obs.* Species *F. melanogastræ* congenerica, sed ab omnibus vestitu unicolori nigrescente distinguenda.

In the 'Proceedings' of last year (*P. Z. S.* 1877, p. 722) Dr. Finsch described a Petrel under the name of *Procellaria albogularis* from the Fiji Islands, which is evidently a near ally of the present bird. This bird, however, differs in having the chin, belly, and upper tail-coverts white, and in some other respects. Of Dr. Finsch's bird I have before me a specimen obtained in Aneiteum, New Hebrides, as long ago as January 1860, I believe by the late John Macgillivray. Curiously enough, it bears the MS. name *albogularis*, selected for it by Dr. Finsch seventeen years subsequently. The native name given in Aneiteum to this bird is "Nichitterin," as the label records.

A similar specimen is in the British Museum, and another in the Leyden Museum. In both places the birds are referred to *Procellaria tropica*, Gould; and all references to *P. tropica* from the Pacific Ocean apply to it. But *Fregetta albogularis* is considerably larger than *P. tropica*, and has a more deeply forked tail than that bird, besides the tail-feathers themselves being much wider. It is doubtful whether *P. tropica*, the original specimens of which were obtained by Mr. Gould himself in the Atlantic Ocean, is really separable from *F. melanogastra*. Mr. Sharpe has already united them under the former name (*Trans.-Venus Exp. Birds*, p. 30.) The following references relate to Dr. Finsch's *Procellaria albogularis*:—

*Procellaria tropica*, Bp. C. R. xli. p. 4 (nec Gould).

*Fregetta tropica*, Bp. Consp. ii. p. 197 (nec Gould).

*Procellaria tropica*, Schl. Mus. P. B., *Procell.* p. 4.

*Fregetta tropica*, Coues, Pr. Ac. Phil. 1864, p. 85 (? partim).

"*Procellaria torquata*, Macgill.," G. R. Gray, Hand-list, iii. p. 104 (nec Macgill.).

*Thalassidroma albogularis*, Macgill. MS.

*Procellaria albogularis*, Finsch (mot. prop.!), *P. Z. S.* 1877, p. 722.

*Oceanites tropica*, Sharpe, *Trans.-Venus Exp.* p. 30 (partim).

The native name of *Fregetta mæstissima* in Samoa is *Seu-ta-peau*; and of its habits Mr. Powell says:—"They often float on the sea in great numbers. They inhabit all the islands of the group, but are most abundant on Manua. They sleep in holes under the trunks of trees at an elevation of 2500 feet, whence they are taken with dogs, which scent them. They are easily extracted from their holes."

## 5. PUFFINUS OBSCURUS.

*Procellaria obscura*, Gm. Syst. Nat. i. p. 559.

*Puffinus obscurus*, Finsch, Journ. Mus. Godeff. Heft xii. p. 40.

*Hab.* Manua, Samoan Islands (*T. Powell*).

Native name "Taio," = Taiko.

Mr. Powell says that these birds are found in the mountains of Manua in holes, as in the case of the Seu-ta-pean (i. e. *F. maestissima*). The natives are very fond of them, and catch and consume great numbers, hunting them with dogs. He gives the dimensions of the specimen sent as follows:—Length 12.6 inches from the tip of the bill to the tip of the tail; bill 1.3; tail 3.3; middle and outer toe 1.8; inner toe 1.5; tarsus 1.6 (black on the outer side, bluish black on the inner); expanse from tip to tip of wings 2 feet 2 inches.

6. On the Use of the generic Name *Gouldia* in Zoology.

By W. H. DALL, Smithsonian Institution.

[Received January 7, 1879.]

Until within a few days I have never been able to point to the exact place where the late Prof. C. B. Adams described his genus *Gouldia*; and most foreign naturalists have supposed that its first appearance was in Jay's Catalogue of Shells of January 1850. According to Marschall's continuation of the 'Nomenclator Zoologicus,' a genus *Gouldia* (*Trochilidæ*) was proposed by "Ch. Bonaparte in Paris Acad. 1850," while another authority places the date of the description in 1849. On this account Mr. Guppy of Trinidad, W. I., proposed to substitute *Crassinella* for the molluscan *Gouldia* of C. B. Adams. I believe this name has somewhere been used by T. A. Conrad for some fossil allied to *Astarte*; but I have not been able to find the reference yet. It is, however, of no consequence, since, even had *Gouldia*, C. B. Ad., been untenable, there are several synonyms which are prior to *Crassinella*, Guppy, for that genus.

I am glad to be able to state definitely, at last, the place of description and date of *Gouldia*, C. B. Ad., and to establish it on a permanent footing, especially as the eminent naturalist from whom it was named was one to whom I owe a lasting debt of gratitude and affection for the almost paternal kindness with which he forwarded my first attempts at the study of natural history.

The story is most briefly told in a few paragraphs of synonomical references.

## Genus GOULDIA, C. B. Adams.

*Thetis*, C. B. Ad. 1845, Proc. Bost. Soc. Nat. Hist. ii. p. 9 (Jan. 1845). Genus described, with two species, *T. cerina* and *T. parva*, from Jamaica. Not *Thetis*, J. Sowerby, Min. Conch. t. 513, 1826.

*Gouldia*, C. B. Ad. (in) Cat. of Genera and Species of recent

Shells in the Coll. of C. B. Adams, etc.<sup>1</sup> p. 29, note, Jan. 1847 (with the same two species as types); Pan. Sh. p. 275, 1852 (*G. pacifica*). Jay, Catal. of Shells, Jan. 1850; *ibid.* 1851. Not *Gouldia*, Bon. 1849-50 (*Aves*).

*Eriphyla*, Gabb, Pal. Calif. i. p. 180, 1864, type *E. umbonata*, Gabb; Stoliczka, Pal. Ind. iii. p. 156, 1871.

? *Eriphylopsis*, Meek, Pal. Upper Missouri, p. 125, 1876 (*E. gregaria*).

*Crassinella*, Guppy, Geol. Mag. Oct. 1874, p. 451, types *C. pacifica* and *C. martinicensis*, loc. cit. Not *Crassinella*, Conrad.

Mr. Gabb's *Eriphyla* was described under the idea that certain characters of the hinge were constant, which an examination of a series of a recent species of *Gouldia* (*G. mactracea*, Linsley) has shown to be variable; and the same is probably true of Meek's *Eriphylopsis*, in which the specimen examined had the teeth reversed, as regards the right and left valves, as compared with the recent species. Such reversals occur in nearly all bivalves in individual cases, and, unless confirmed by the testimony of a large series, can hardly be held to have any systematic value.

It would seem, therefore, that the genus *Gouldia* of Bonaparte requires a new name; but, with Mr. Guppy's example as a warning, I shall leave that to the ornithologists to settle.

It may be remarked, however, that another genus of *Trochilidæ*, *Halia*, Mulsant and Verreaux (Mém. Cherbourg Soc. Sc. Nat. xii. 1866), is preoccupied by Risso (Eur. Mér. 1826) for a valid genus of mollusks. It may also be questioned whether *Doryfera*, Gould, P. Z. S. 1847, has the right to exist simultaneously with *Doryphora* (Illiger, 1811, and Kütz. 1844). Moreover *Glaucus* (Bruch, Cab. Journ. 1853, *Laridæ*) was used for a mollusk by Forster in 1800, and *Gnathodon* (Jardine, Ann. Nat. Hist. xvi. 1848, *Columbidæ*) was used by Gray for a mollusk in 1825.

Washington, Dec. 25, 1878.

7. A few Notes upon Four Species of Lemurs, specimens of which were brought alive to England in 1878<sup>2</sup>. By  
GEORGE A. SHAW.

[Received January 9, 1879.]

(Plate IX.)

1. THE RING-TAILED LEMUR<sup>3</sup>.

As far as my experience of seven years goes, these Lemurs are found only in the south and south-western borders of the Bétsileo province of Madagascar. This province is about 150 miles in length, by 50 or 60 in width, and is situated on the central tableland, about 100 to 250 miles south of Antanânarivo, the capital of Madagascar.

<sup>1</sup> Middleburg, Vt., Justus Cobb, 1847, 8vo, pp. 32. The preface is dated January 1847.

<sup>2</sup> [See above, p. 2.—P. L. S.]

<sup>3</sup> [*Lemur catta*, Linn.—P. L. S.]



A forest extends along the whole eastern side of this province, fringing the tableland, and covering all the slopes down into the lowland bordering the sea; but nowhere in these forests have the Ring-tailed Lemurs been found. Their habitat in the south and south-west is among the rocks, over which they can easily travel, where it is impossible for the people, although bare-footed, to follow. An examination of their hands will show that they are preeminently adapted for this kind of locomotion. The palms are long, smooth, level, and leather-like; and enable the animal to find a firm footing on the slippery wet rocks, very much on the same principle as that which assists the fly to walk up a pane of glass. The thumbs on the hinder hands are very much smaller in proportion than in the Lemurs inhabiting the forests, which depend upon their grasping-power for their means of progression. These spring from tree to tree, and rarely if ever touch the ground, except in search of water.

Hence the Ring-tailed Lemurs are an exception to the general habits of the Lemuridæ, in that they are not arboreal. There are very few trees near their district; and those which do grow there are very stunted and bushy.

These Lemurs are provided with two long canine teeth or fangs in the upper jaw, those of the male being considerably longer than those of the female. These they use to take away the outer coating of the fruit of the prickly pear, which is full of fine spines, and constitutes their chief article of winter food, and which grows abundantly in the crevices and around the foot of the rocks. Their summer food consists of different kinds of wild figs and bananas. Their fangs are doubtless used as weapons of self-defence, although when fighting I have noticed that they depend a great deal upon their hands, with which they scratch and strike. I have seen the male put a dog larger than itself to the rout in this way.

They are very easily tamed, and in captivity will eat almost any kind of fruit, but do not like meat in any form. By a little care, they can be induced to feed upon cooked rice, upon which they thrive. In their natural state, they do not drink, as is proved not only from the native accounts, but also by the fact that for the first month or two after being caught, and while living on bananas, they do not drink. It is curious that all the species of Lemurs living on the west, including the two kinds of white Lemurs, appear to subsist without water; whilst all those on the east invariably drink at their meals.

## 2. THE BROAD-NOSED LEMUR<sup>1</sup>.

This one was caught and chained up last January. It came from the higher-level forests on the eastern side of the Betsileo, among the bamboos, on which it appears in a great measure to subsist. Its teeth are different from those of any other kind of Lemur with which I am acquainted. It has the few sharp outwardly inclined teeth in the lower jaw in the front common to all Lemurs, and which they use

<sup>1</sup> [*Hapdlemur sinus*, Gray, P. Z. S. 1870, p. 828, pl. lii.—P. L. S.]

as scrapers, and not to bite with. Besides these, nearly all its teeth are serrated cutting-teeth, and are arranged, not in opposition, but so as mutually to intersect. In this respect it is admirably accommodated to suit the country in which it lives, as with the greatest facility it can bite off the young shoots of the bamboo, and mince up a whole handful of grass blades and stalks at once, each bite cutting clean, like a pair of scissors. Like very many grass-eating animals, it seems to feed nearly all day long. For several months I had this one chained on the lawn; and it scarcely ceased gathering the grass within its reach, and eating it, from morning till evening. It is also unlike other Lemurs in its dislike of fruit. I have tempted it with very many different kinds of berries and fruits growing in the forest; but it would not touch any of them. It is very fond of cooked meat, and also of sugar-cane; and it was owing to its desire for sugar that it has been coaxed to eat cooked rice, which is now its staple food. It is furnished with a remarkably broad pad on each of the hinder thumbs, by means of which it is enabled to grasp firmly even the smoothest surfaces. Unlike most other Lemurs, its head is very round, although the female has a somewhat more pointed snout than the specimen now in the Society's Gardens. Its cry is very peculiar, at times resembling the quack of a duck, at other times loud and piercing. Its tail is long, but not very bushy.

### 3. THE BROWN MOUSE-LEMUR<sup>2</sup>. (Plate IX.).

This small and highly interesting animal was caught in November 1877, since which time it has lived in a small box, and has been allowed a little exercise about the room each night. It is nocturnal in its habits; and its food consists of fruits and possibly honey: of this there is abundance in the forests on the eastern side of Betsileo, from the lower parts of which the animal was brought. The specimen is full-grown, about seven or eight inches in length; has a pointed snout and very prominent eyes, large ears, and round rat-like tail, which is not prehensile. It is of a brownish-grey colour, approaching to white on the underparts. Its four legs are almost equal in length, thus rendering it difficult for this Lemur to leap any considerable distance, as the majority of species can. It runs on all fours, but sits up to eat, holding its food in the fore hands. I fancy that in the winter months in its natural state it hibernates, because in the beginning of last winter (that is in June), after several nights' good exercise, during which time it had the opportunity of eating as much banana as it chose to take, I was astonished in the evening, on opening its box, to find it still asleep, and quite cold to the touch. At first I thought it was dead; but by holding it near to a fire and rubbing it, it gradually awoke, and when thoroughly warmed appeared none the worse in health. This happened two or three times, and without any apparent cause, as there was no ill health, nor was the weather particularly cold. From this fact, and from the sudden and unnatural enlargement of the

<sup>1</sup> My notes with these particulars have not yet arrived.

<sup>2</sup> [This seems to be *Chirogaleus milii*, Geoffr.—P. L. S.]

tail, which unfortunately still continues, I presume, had it been in its native forest, it would under the same circumstances have slept through the winter. It makes a nest of leaves or dry grass, by carefully scooping a hollow big enough to contain itself, and then, after getting in, covering itself with the loose leaves or grass. The native tradition also confirms my opinion with regard to its hibernation. They say that it hides in the hollow trees in the winter.

It appears to be a very uncommon animal, even in Madagascar, as this is the only specimen I have been able to obtain, although I kept a man in the forest for two months seeking for one after I had obtained this one. Of course, the fact of their sleeping all day and only feeding at night adds to the difficulty of catching them.

It was easily tamed, and proved very affectionate; comes when called by name, and enjoys being fondled and rubbed.

#### 4. THE DWARF LEMUR<sup>1</sup>.

This is another species of nocturnal animal, and is the most diminutive Lemur with which I have become acquainted. They inhabit a belt of forest-land stretching from the eastern forest into the heart of Betsileo, a few miles north of Fianarantsoa, where they are tolerably abundant. They live on the tops of the highest trees, choosing invariably the smallest branches, where they collect a quantity of dried leaves, and make what from below looks like a bird's nest. So close is the resemblance, that it requires good eyes to distinguish the one from the other.

Their food consists of fruit and insects and most probably honey. I have frequently seen them catching the flies that have entered their cage for the honey; and I have supplied them with moths and butterflies, which they have devoured with avidity.

They are extremely shy and wild. Although I have had between thirty and forty caged at different times, I have never succeeded in taming one. They are also very quarrelsome, and fight very fiercely, uttering a most piercing penetrating sound, somewhat resembling a very shrill whistle.

The teeth are very minute, but exceedingly sharp; and when they bite they hold so tenaciously that it requires a good shake and knock to make them let go. These Lemurs can leap better than No. 3: but still their usual mode of progression is on all fours; and when running up any branches which they can grasp with their hands, they are very nimble indeed, very much more so than when on the ground. They are very strong in their hind legs and hands. I have often seen them swing themselves down from their perch holding by the hind hands, grasp their food in the two fore hands, and then gradually draw themselves back again into their former position on the perch. In this they are assisted by the tail only as a balance and not as an additional grasping-member. And although the tail is of considerable assistance when stretching out from one branch to another, by being partly twisted round the branch, it is certainly not prehensile in the same sense as some monkeys' tails are.

<sup>1</sup> [*Microcebus smithii* (Gray).—P. L. S.]

Their eyes are large and brilliant, their ears large, and their hands beautifully perfect, with ordinary-sized nails on each finger, except the second of the hind hands, which is furnished with the long scratching-claw.

They bring forth two, and sometimes three at a birth; but I have had none breed in captivity.

## 8. Descriptions of new Asiatic Diurnal Lepidoptera.

By F. MOORE, F.Z.S.

[Received January 14, 1879.]

### DANAÏNÆ.

#### DANAIS PERSIMILIS, n. sp.

Nearest allied to *D. expropta*, Butler (the Ceylon form of *D. juvena*), but is much smaller in size. The markings are similar; but those from the base of the wings are very much more attenuated and shorter, and the discal spots also smaller, the markings on the hind wing being more attenuated than those in *D. grammica*.

Expanse  $2\frac{3}{8}$  inches.

*Hab.* Petchaburrec, Bangkok District, Siam (April 12, 1875).  
In coll. R. Meldola and F. Moore.

### NYMPHALINÆ.

#### NEPTIS CAMBOJA, n. sp.

*Male.* Upperside—fore wing with a pale ferruginous broad longitudinal band from the base to beyond the cell, a broad oblique subapical and a constricted lower band; also two very narrow indistinct ferruginous marginal lines: hind wing with a broad ferruginous transverse discal, and narrow slightly curved submarginal band; also a single very narrow and indistinct ferruginous marginal line. Underside pale yellowish ferruginous; bands as above, but indistinctly defined.

Expanse  $1\frac{1}{2}$  inch.

*Hab.* Cambodia (*Mouhot*). In coll. N. C. Tuely, Esq.

Allied to *N. dindinga*, Butler, from Malacca. Also allied to *N. heliodore*, Fabr., from Siam (the *type* specimen of which is in the Banksian cabinet in the British Museum), but differs above on the fore wing in the discoidal streak not extending over the median vein, and in the submarginal band on the hind wing being narrower. On the underside these differences also occur, and the dark interspace between the bands on the hind wing is also narrower.

#### NEPTIS SINUATA, n. sp.

Allied to *N. hordonia*, Stoll. Differs on the upperside in the bands having deeply sinuated borders. Underside also paler; the strigæ less prominent, and disposed in more blotchy patches.

Expanse, ♂  $1\frac{5}{8}$ , ♀  $1\frac{7}{8}$  inch.

*Hab.* Ceylon. In coll. F. M. Mackwood and F. Moore.

*VANESSA HARONICA*, n. sp.

Differs from the Indian *V. charonia*, Drury, in the blue band on the fore wing being continuous and broader. On the hind wing the band crosses the middle, is straight, and has no black spots within it, but has a parallel outer row of small black spots.

Expanse, ♂  $2\frac{5}{8}$ , ♀ 3 inches.

*Hab.* Ceylon. In coll. F. M. Mackwood and F. Moore.

*ADOLIAS ANNAMITA*, n. sp.

Differs from *A. evelina*, Stoll, pl. 28. f. 2, in both sexes being more falcated in the fore wing, in having a longitudinal white costal patch immediately before the apex, and in the female having, both above and beneath, the discal space of the fore wing broadly greyish white, sparsely irrorated with green scales, and leaving only a distinct marginal border; the hind wing also pale-speckled along the discal border of the dark base.

Expanse, ♂ 3, ♀  $3\frac{3}{4}$  inches.

*Hab.* Cochin China. In coll. H. Druce.

## NEMEOBIINÆ.

*ABISARA PRUNOSA*, n. sp.

Differs from the Malacca species (*A. kausambi*, Feld.) in the male having more prominent darker bands on the fore wing and prominent black spots on the hind wing. The female differs also in its paler colour, and uniformly pale transverse discal bands without any trace of white at their costal end.

Expanse  $1\frac{1}{2}$  to  $1\frac{3}{4}$  inch.

*Hab.* Ceylon. In coll. F. Moore.

## LYCÆNIDÆ.

*SPALGIS*, n. g.

Allied to *Gerydius* (*Symethus*, Horsf.). Male with fore wing more trigonal, the costa straighter, the third subcostal branch bifid, the fifth branch starting from end of cell: the hind wing is also more trigonal in male, and the exterior margin is even in both sexes. Antennæ short, club thickish.

*SPALGIS EPIUS*.

*Lucia epius*, Westw. Gen. D. L. p. 502, pl. 76. f. 5.

*CURETIS DENTATA*, n. sp.

*Male.* Fore wing slightly concave, but not scalloped out on exterior margin; red patch very broad, with a dentate black mark at the end of the cell, and its outer border sinuous: hind wing convex and slightly sinuous on its exterior margin, with the red broadly diffused; outer border narrow; the basal streak and abdominal border dusky black.

*Female* with fuliginous brown borders and white discal patch; the dentate mark on fore wing distinct.

Expanse  $1\frac{5}{8}$  inch.

*Hab.* Deyra Doon, N.W. India (*G. Austen*). In coll. F. Moore.

Distinguished from *C. bulis*, Doubleday and Hewitson (*Gen. D. Lep.* pl. 75. f. 5), in the fore wing not being falcate, and in the exterior margin of the hind wing not being angular in the middle.

#### CURETIS DISCALIS, n. sp.

*Male*. Distinguished above by the bright red of the fore wing being confined to a narrow elongated patch, and that on the hind wing also confined to a small oblong lunular discal patch, which is slightly dentate on the middle of its inner border: fore wing somewhat short and truncate.

Expanse  $1\frac{3}{8}$  inch.

*Hab.* Nepal (*General Ramsay*); Darjiling (*Atkinson*). In coll. F. Moore and Dr. Staudinger.

#### ANOPS STIGMATA, n. sp.

*Male*. Fore wing short, apex not falcate, exterior margin slightly scalloped, the bright red patch broad and sinuous on its apical border: hind wing quite convex and even along exterior margin, with a well-defined black outer border and prominent black longitudinal narrow median basal band or streak; the abdominal border dusky.

Expanse  $1\frac{5}{8}$  inch.

*Hab.* Moulmein, Burmah. In coll. F. Moore.

Has most resemblance to the male of *C. thelys* in the contour of the wings.

#### POLYOMMATUS PSEUDEROS, n. sp.

*Male*. Upperside smalt-blue, with somewhat broad greyish-black maculated exterior borders; cilia with a blackish inner line. Underside pale ochreous-grey: fore wing with a white-circled black dot in middle of the cell, a streak at its end, a discal series of six spots, and a marginal row of less-distinct black spots bordered inwardly by a pale ochreous-red and black lunule: hind wing speckled with green and black at the base; a transverse subbasal series of four white-circled black spots, a curved discal series of seven similar spots, a paler streak at the end of the cell, a very prominent row of marginal spots bordered by an inner ochreous-red and black lunule, and an intervening short longitudinal discal white dash; cilia white.

*Female*. Upperside brown, with a submarginal series of small ochreous-red lunular spots. Underside darker-coloured than male; markings the same.

Expanse, ♂  $1\frac{1}{10}$ , ♀  $1\frac{2}{10}$  inch.

*Hab.* Sind valley, Kashmir (*Atkinson*). In coll. Dr. Staudinger.

Allied to *P. eros*; differing above in having the outer margins more decidedly maculated with greyish-black, and in the fore wing beneath having no spots at the base; the discal row of spots also are disposed

in a more linear series; and the ochreous red borders to the marginal spots are less dentated with black on their inner border.

*POLYOMMATUS LIMBATUS*, n. sp.

*Male*. Upperside lilac-blue; cilia white, with an inner black line: fore wing with a very narrow exterior marginal black band: hind wing with a very narrow marginal black line and a few minute speckles at apex. Underside white, with slender dusky markings, as in *P. puspa*.

Expanse  $1\frac{2}{3}$  inch.

*Hab.* Parisnath hill, Behar, Bengal. In coll. F. Moore.

Differs from *P. dilectus* in its more pointed fore wing, darker colour, and more prominent marginal line.

*POLYOMMATUS TRANSPECTUS*, n. sp.

*Male*. Upperside blue; both wings with a broad outer marginal black band, broadest at apex of fore wing; the band on the hind wing maculated. Underside white, with indistinct slender dusky markings disposed as in *P. puspa*; the costal spot only prominent and visible above.

Expanse  $1\frac{1}{8}$  inch.

*Hab.* Khasia hills, E. Bengal. In coll. F. Moore.

*POLYOMMATUS ALBOCÆRULEUS*, n. sp.

*Male and Female*. Upperside pale clear blue, discal area of fore wing and apical area of hind wing white: fore wing with a broad outer marginal black band terminating in a point at the posterior angle in the male, but not reaching the angle in the female: hind wing with a narrow marginal black line and a series of small indistinct spots, the latter still less apparent in the female; cilia white, with an inner bordered line adjoining band on fore wing. Underside white, with small and slender black markings disposed similar to those in *P. puspa*, but without the lunular line encompassing the marginal spots.

Expanse, ♂  $1\frac{1}{8}$ , ♀  $1\frac{3}{8}$  inch.

*Hab.* Nepal (*Ramsay*); Deyra Doon (*G. Austen*). In coll. F. Moore.

*POLYOMMATUS DILECTUS*, n. sp.

*Male*. Upperside pale lilac-blue, with a very slender marginal black line; discal area of fore wing and apical area of hind wing slightly whitish; cilia white. Underside white, with small slender indistinct blackish markings disposed as in *P. puspa*.

*Female* similar to *P. puspa*, but paler above, the exterior dusky-brown band on fore wing of less breadth, and the blue extending to posterior margin: hind wing bluer, less dusky anteriorly, with a marginal row of indistinct dusky spots.

Expanse 1 to  $1\frac{1}{4}$  inch.

*Hab.* Nepal; Sikkim; N. Cachar. In coll. F. Moore.

*APHNÆUS LUNULIFERA*, n. sp.

Upperside dark greyish-blue, the borders dark brown: fore wing with a small ochreous red lunule beyond end of the cell: hind wing with a dark ochreous red anal lobe, containing two prominent black silver-streaked spots. Underside pale ochreous-brown, the bands and spots defined only by prominent black lines and silver-streaked centres; anal lobe bright vermilion, the black silvered-streaked spots prominent.

Expanse  $1\frac{2}{10}$  inch.

*Hab.* Darjiling (*Atkinson*). In coll. Dr. Staudinger.

Differs from *A. ictis*, Hewits. Exot. Butt. pl. 25. figs. 8 & 9, above in having a dissimilar-shaped subapical mark. Underside also of a different colour. *A. elima*, Moore, also differs from this in being paler-coloured above, of a deeper colour beneath, in having the markings nearly obsolete, and in the absence of the red patch on anal lobe.

*DEUDORIX LAZULINA*, n. sp.

*Male.* Upperside dull dark lazuline-blue, outer borders black, abdominal margin grey, anal lobe black. Underside brownish grey: fore wing crossed by a discal band of two narrow white lunular lines, and a short streak at end of the cell: hind wing crossed by similar irregular bands, the discal bent upward to middle of anal margin; a black spot bordered above with ochreous at anal angle, and another beyond.

*Female* purple-grey above, ochreous-grey beneath; marked as in male.

Expanse  $1\frac{1}{4}$  inch.

*Hab.* Ceylon. In coll. F. M. Mackwood and F. Moore.

Allied to the Javan *D. varuna*, Horsk. Catal. Lep. E.I. C., p. 91, and to *D. orseis*, from Singapore.

*DEUDORIX SCHISTACEA*, n. sp.

*Male.* Upperside dark slaty-blue: underside buff-grey; both wings crossed by a narrow discal band of two white lunular lines, and a cell streak; a black anal spot bordered above with white and another beyond bordered with ochreous.

*Female* purple-blue, borders slightly purple-brown.

Expanse  $1\frac{1}{4}$  inch.

*Hab.* Calcutta (*Atkinson and Farr*). In coll. F. Moore and Dr. Staudinger.

Allied to *D. varuna*. May be distinguished by the blue colour of the male pervading the entire surface of the upperside.

*DEUDORIX GRISEA*, n. sp.

*Male.* Upperside dull greyish blue, outer border dusky back. Underside dull lavender-grey; both wings crossed by a broad darker band bordered by a pale lunular line, and a cell-streak; anal spots black, the outer ochreous-bordered above.



*Female* pale greyish blue above, border dusky brown.

Expanse, ♂  $1\frac{5}{16}$ , ♀  $1\frac{6}{16}$  inch.

*Hab.* Deyra Dhoon, N.W. Himalaya (*G. Austen*). In coll. F. Moore.

Allied to *D. schistacea*.

**DEUDORIX RECTIVITTA, n. sp.**

*Male.* Upperside dark dusky blue, borders black. Underside pale vinous brownish buff; both wings crossed by a straight narrow tapering dark-brown pale-outer-bordered band, a paler cell-streak, and an indistinct brownish submarginal fascia; the band on hind wing bent and zigzag above anal angle; a small black anal and sub-anal spot speckled ochreous and white, a few speckles also between them.

Expanse  $1\frac{1}{2}$  inch.

*Hab.* N. Cachar (*G. Austen*). In coll. F. Moore.

Nearest allied to *D. nissa*, Kollar, from N.W. Himalayas.

**DEUDORIX LANKANA, n. sp.**

*Female.* Upperside pale violet-brown, marginal line black; cilia pale ferruginous; anal lobe ferruginous; tail black; cilia at anal angle and beyond tail white. Underside pale ferruginous, the margin darker; crossed by a narrow ferruginous-brown discal band; a black spot at anal lobe and a speckled spot beyond, both of which and the end of the band are bordered with white speckles. Legs blackish, banded with white.

Expanse  $1\frac{1}{8}$  inch.

*Hab.* Ceylon (Kottawah forest near Galle). In coll. Capt. Wade.

**AMBLYPODIA NARADOIDES, n. sp.**

*Male.* Upperside dark violet purple-brown, with a broad dusky-black marginal band; anal lobe and tail chestnut-brown, the angle white-speckled. Underside dark purple-brown; transverse band, speckled marks on basal area, and a submarginal series of speckled spots black, the latter and anal angle white-speckled.

*Female.* Upperside dark brown; fore wing with the lower basal and discal area smalt-blue. Underside pale brownish grey, transverse line and speckled markings black; anal angle ferruginous.

Expanse, ♂  $1\frac{1}{8}$ , ♀  $1\frac{7}{8}$  inch.

*Hab.* Ceylon. In coll. Capt. Wade and F. Moore.

A much darker insect than the Javan species *A. narada*, Horsf.

**AMBLYPODIA DARANA, n. sp.**

Differs from *A. naradoides* in being larger, the upperside of the male of a deeper violet-blue, the marginal band narrower; anal lobe red only in the middle, its margin and the tail black. Underside purple chestnut-brown; speckled markings black, the marginal series white-speckled.

*Female.* Pale violet-brown above. Underside similar.

Expanse, ♂  $1\frac{9}{16}$ , ♀  $2\frac{1}{8}$  inches.

*Hab.* Ceylon (Kottawah forest near Galle). In coll. Capt. Wade and F. Moore.

SURENDRA<sup>1</sup>, Moore.

SURENDRA LATIMARGO, n. sp.

Near to *S. vivarna* (*Amblypodia vivarna*, Horsk. Catal. Lep. E. I. C. 1829, p. 99), from Java. Differs in being smaller, with slightly shorter wings, the hind wing less convex at the anterior angle and outer margin; the upperside of *male* has a much broader brown outer border, and the hind wing has scarcely any blue on the disk. The underside is purplish fawn-colour, the outer transverse sinuous line darker, and the inner zigzag line with less white border. The *female* differs also in being of a dark vinous brown above, with a slightly paler discal area on fore wing, and of a dark fawn-colour beneath.

Expanse, ♂  $1\frac{2}{10}$ , ♀  $1\frac{4}{10}$  inch.

*Hab.* Andamans. In coll. F. Moore.

SURENDRA DISCALIS, n. sp.

This also differs from *S. vivarna* in having a broader border in the male. The wings are of the same shape as in *S. latimargo*. The female above is ochreous-brown slightly violet-tinted, with a prominent pale ochreous discal area. Underside greyish basally, ochreous brown externally, with dark sinuous markings.

Expanse, ♂ ♀  $1\frac{3}{10}$  inch.

*Hab.* Ceylon. In coll. F. M. Mackwood and F. Moore.

PIERINE.

CATOPHAGA PSEUDOLALAGE, n. sp.

Allied to *C. lalage*, Doubleday, Gen. D. Lep. pl. 6. f. 3.

*Male.* Differing on the fore wing in the black apical band, the discal and cell-spot being smaller—the hind wing having but a slight black linear tip to the upper veins.

*Female* marked like the male of *C. lalage* (*Durva*, Moore, P. Z. S. 1857, pl. 44. f. 6), some specimens having the black discal and cell-spot on fore wing confluent and extending in a continuous band down the upper part of cell. Underside of both sexes dull ochreous, palest in male; apex of fore wing and the hind wing brown-speckled, the latter with darker brown zigzag speckled fasciæ.

Expanse, ♂  $2\frac{1}{2}$ , ♀  $2\frac{3}{4}$  inches.

*Hab.* Sikkim. In coll. F. Moore.

CATOPHAGA LANKAPURA, n. sp.

Allied to *C. alope*, Wallace, Tr. Ent. Soc. 1867, p. 372.

*Male.* Differs above in the fore wing being less black at the apex, and the hind wing having but a few indistinctly scattered black scales at end of the veins. Underside bright deep yellow.

<sup>1</sup> Type, *S. quercetorum* (*Amblypodia quercetorum*, Moore, Catal. Lep. E. I. C. i. p. 42, pl. 1 a. fig. 7.).

*Female.* Similar above and beneath, excepting that the black curved band on fore wing is twice the width, and the hind wing having a submarginal macular fascia composed of black scales.

Expanse, ♂  $2\frac{4}{8}$  ♀  $2\frac{3}{8}$  inches.

*Hab.* Ceylon. In coll. F. M. Mackwood and F. Moore.

Distinguished from the allied Ceylon species *C. galene*, Felder, Nov. Reise, p. 165, by the bright yellow colour of the underside.

#### APPIAS TAPROBANA, n. sp.

Differs from typical specimens of *A. hippo*, Cram. Pap. Exot. ii. pl. 195, f. B, C, from Sumatra, in its smaller size, the male having a darker and somewhat broader well-defined dentate marginal band above, the underside having the prominent apical spot and the hind wing of darker yellow, the band being quite as broad, the costal vein narrowly and the subcostal broadly speckled with dark brown.

*Female.* Above with broad well defined sinuous borders, the disk of fore wing and basal area of hind wing broadly whitish, similar to the female of *A. vacans*; underside as in male.

Expanse  $2\frac{3}{8}$  inches.

*Hab.* Ceylon. In coll. F. M. Mackwood and F. Moore.

### PAPILIONINÆ.

#### PAPILIO CASYAPA, n. sp.

From Himalayan specimens of *P. panope*, Linn. (Cram. Pap. Exot. iv. pl. 295. f. E, F), this differs in the male being of a darker purple brown, and the female darkest-coloured on the fore wing basally between the veins. The fore wings in both sexes have a third or inner discal series of speckled dentate marks on both upper and undersides, these being most prominent in the female; hind wing with well-defined and broad markings.

Expanse  $4\frac{1}{4}$  inches.

*Hab.* Calcutta district (*Russell and Farr.*). In coll. F. Moore.

#### PAPILIO LANKESWARA, n. sp.

Distinguished from *P. panope* and *P. clytia* by its much paler colour, the fore wing having the veins broadly and the outer border pale coffee-brown, the basal interspaces between the veins only being dusky black; the marginal spots are very small, the upper series being obsolete in the male and indistinct in the female; hind wing with the discal dentate marks less distinct, shorter and widely separated from the submarginal narrow dentate lunules, marginal lunules broadest in the male.

Expanse 4 inches.

*Hab.* Ceylon. In coll. F. M. Mackwood and F. Moore.

This is certainly not *P. lacedæmon*, Fabr. It does not agree either with the description or with Donovan's figure.

## HESPERIDÆ.

## GOMALIA, n. g.

Wings short: fore wing with the costa slightly arched at the base, apex acute, exterior margin oblique, posterior angle slightly convex, costal vein short; subcostal vein five-branched, first, second, and third arising before end of the cell, fourth and fifth from its end; upper discocellular angled, lower oblique, upper radial from angle of upper discocellular, lower radial from its end; median vein three-branched, middle branch from near end of the cell; submedian vein nearly straight: hind wing lobed and angled near base of costal margin, apex and exterior margin very convex; costal vein extending to near apex, subcostal vein two-branched, one radial; median vein three-branched. Body short, thorax stout; palpi thickly pilose; antennæ short, with a thick very blunt club; legs moderately long, squamous.

## GOMALIA ALBOFASCIATA, n. sp.

Upperside dark greyish brown: fore wing with a black transverse basal and a discal band, a small white streak at end of the cell, two lunular spots on the disk and three contiguous spots obliquely before the apex: hind wing with a broad white median transverse band. Underside paler, white markings as above. Palpi white beneath.

Expanse  $\frac{7}{8}$  inch.

*Hab.* Ceylon. In coll. Capt. Wade.

A single specimen captured between Kirrinde and Werewille beyond Hambantotte, on the S.E. coast.

## 9. On a new Rodent from Medellin.

By Dr. A. GÜNTHER, F.Z.S.

[Received February 4, 1879.]

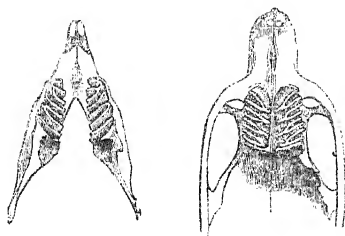
(Plate X.)

The British Museum has lately received from the vicinity of Medellin, Columbian Confederation, through Mr. J. K. Salmon, the skin of a Rodent, which, though evidently taken from a specimen not fully adult and not in perfect condition, represents characters so well marked that it cannot fail to be recognized by the following notes. It is the type of a distinct genus in the family of Octodontidæ.

## THRINACODUS, g. n.

Legs of moderate length; toes four in front and five behind; claws small. Eyes small; ears broad, short, with long sparse hairs round the margin; nose hairy, except on a narrow stripe in the median line, which is naked. Tail very long, finely verticillated, but rather densely covered with short stiffish hairs. Fur soft, dense and long. Facial portion of the skull short; incisive foramina short, but extending into the maxillaries. Molar teeth extremely broad, the anterior in the upper jaw nearly meeting in the middle line, and

interrupting the continuity of the bony palate. Each of the two anterior upper molars with two pairs of enamel folds, those of each pair meeting interiorly and forming a kind of fork. Enamel folds of the anterior lower molar more irregular; the second with three folds, the two anterior forming a loop<sup>1</sup>.



Dentition of *Thrinacodus albicauda*.

THRINACODUS ALBICAUDA. (Plate X.)

Fur along the back of uniform softness and length, the longest hairs being about an inch long; lower parts covered with shorter, but likewise soft and dense fur. Bright reddish-brown above, the longest hairs being black towards the extremity; roots of the hairs grey. Lower parts white. Basal half of the tail like the back, terminal half white, with a greyish tinge towards the extremity.

	millim.
Length of head and body .....	150
Length of tail .....	255
Length of sole of fore foot .....	20
Distance between heel and extremity of middle toe ..	38
Length of skull .....	40
Distance between the incisor and first molar .....	8
Length of first upper molar ..	4.5
Width of first upper molar .....	4

February 18, 1879.

Prof. W. H. Flower, LL.D., F.R.S., President, in the Chair.

The Secretary exhibited, on behalf of the Rev. F. O. Morris, an example of *Bombyx quercus* with the antennæ malformed, being much smaller than the ordinary size.

Mr. Sclater laid before the Meeting an example of a Humming-bird obtained at Guajango, in Northern Peru, by Messrs. Stolzmann

<sup>1</sup> Only the two front molars above and below have been preserved; the third, which was still in an undeveloped condition, is lost. But it is not likely that in the adult dentition the breadth of the molars would be diminished.

and Jelski, and forwarded to Mr. Selater for examination by M. L. Taczanowski, of Warsaw, C.M.Z.S.

Mr. Selater stated that, after careful examination and consultation with Mr. Gould and Mr. Salvin, he had come to the conclusion that this bird must be referred to a new species, which he proposed to characterize as follows:—

*THAUMASIUS*<sup>1</sup> *TACZANOWSKII*, sp. nov.

*Supra metallice viridis, in capite cupreo lavatus, plumis subtus cinereis; alis fuscis, tectricibus dorso concoloribus; cauda æquali, supra dorso concolori, versus apicem cupreo tineta, subtus fusca, versus apicem cupreo-virescente; corpore subtus albo, lateraliter et in crisso præcipue pallido cinereo perfuso; gutture toto punctis minutis, cordiformibus, nitenti-viridibus oblecto; rostro forti, paulum incurvo: long. tota 4·0, alæ 2·6, caudæ 1·5, rostri a rict. lin. dir. 0·9.*

*Hab.* Guajungo, prov. Cajamarca, Peru.

*Obs.* Sp. *Th. viridicipiti*, Gould, ut videtur, affinis, rostro fortiusculo, cauda æquali, et maculis gutturis minutis insignis.

Mr. Selater exhibited a living *Amphispæmian* lately received by the Society from Monte Video, which appeared to be referable to *Amphispæna darwini*, D. & B.

The following papers were read:—

1. Note on the *Pachycephala icteroides* of Peale, with Description of a supposed new Species. By E. L. LAYARD, C.M.G., F.Z.S.

The acquisition of the part of the 'Proceedings' of the Society for March and April of 1878, has put me in possession of the remarks of Mr. W. A. Forbes on *Pachycephala icteroides*, Peale, from Samoa (page 351), and has induced me to reconsider my opinion on that species given P. Z. S. 1876, p. 494. Unfortunately I can only do this from memory, as the Part (No. 3, of 1876) containing that page is wanting from my series.

In general terms, I believe I said "I doubt the occurrence of *P. icteroides*, Peale, in Samoa." To this belief I was led by Drs. Finsch and Hartlaub including it as a Fijian species in their 'Fauna Centralpolynesiens' in the "Einleitung" of which (page xxxiv) *P. icteroides* is given as from the "Viti-Gruppe," and from Viti Levu in particular. The bird I identified with *P. icteroides* is found on Ovalau, and as certainly is not found in Samoa. With *P. graffii*, Hartlaub, I at first confounded it (P. Z. S. 1875, p. 433), believing that another bird, that I afterwards named *P. intermedia*, was

<sup>1</sup> Hoc nomen ex θαυμάσιος, admiratione dignus, derivatum, "*Thaumasius*," nec "*Thaumatis*" melius scribatur.

*P. vitiensis*. The acquisition of the true *P. græffii* set me right; and I then settled that the bird was *P. icteroides*, never dreaming that a bird so far from uncommon could have escaped the notice of Drs. Gräffe and Finsch, and that there could be a *third* new species in Fiji, as I now see it to be.

I did not sufficiently consider the diagnosis given by Drs. Finsch and Hartlaub, which omits entirely the *jet-black head* possessed by my bird. Now also I have the advantage of reference to the original description and figures by Peale (Cass. Un.-St. Expl. Exp. (1858), p. 161. pl. x. fig. 3), thanks to the Smithsonian Institution; and I at once recall my observations.

What *P. icteroides* is I know not, unless it be the young of *P. flavifrons* (Peale). This Fijian bird is apparently undescribed; and as it has escaped notice up to this moment, I shall name it, if new,

*PACHYCEPHALA NEGLECTA*, n. sp.

♂. Above, back obscure darkish green, with a small patch of yellow on the immediate rump; head shining jet-black, all but the throat and chin, and a very small spot (not always present) between the eye and the nostril, which is of the light brilliant yellow of the whole of the underparts. In some specimens, a few straggling black feathers on the lower part of the throat, encroaching on each side of the chest, seem to point to the formation of a narrow black collar across the chest, such as is found in my *P. intermedia*. Wing-primaries edged more or less broadly with greenish grey (tail-feathers tipped with the same); secondaries broadly edged and tipped with pale yellow. The yellow of the underparts is a little darker than in *P. flavifrons*, agreeing, as far as my memory serves, with *P. intermedia*, of which I unfortunately have not retained a specimen, but is far less deep (orange-tinted) than in *P. græffii* or *P. torquata*, Layard. Length 6" 6"; wing 3" 9"; tail 2" 10"; tarsus 13"; bill (to gape) 12". Bill black; legs bluish; iris dark brown.

*Hab.* Ovalau, Fijis.

This species differs entirely from *P. flavifrons*, Peale, in which the colour of the back is cinereous, with the faintest tinge of green, the head being of the same colour; on the latter the spot on forehead is far larger and is united over the bill; the wing-primaries are only most narrowly edged with grey; and the whole form is slighter. I give the dimensions of *P. flavifrons* for comparison. Length 6"; wing 3" 3"; tail 2" 6"; tarsus 10½"; bill (to gape) 10".

Of the female of *P. neglecta* I unfortunately know nothing; but a very young male just showing a trace of yellow below, is of a palish chocolate-brown above throughout, tinged with green; below it is of a warm deep cinnamon-brown, with here and there a yellow feather. This is so like a female *P. vitiensis*, that I suspect it is also the livery of the female *P. neglecta*, nob.

On Viti Levu *P. neglecta* is replaced by the narrow-collared species, *P. intermedia*, nobis; *P. torquata*, nob., is confined, I think, to Tavuni; *P. græffii*, F. & H., to Vanua Levu; and *P. vitiensis*, G. R. Gray, to Kandavu.

I have six specimens of *P. neglecta*, all males, in various phases of plumage, all from Ovalau—and five of *P. flavifrons*, male, female, and young, of both sexes.

2 Description of four new Species of *Chameleon* from Madagascar. By Dr. A. GÜNTHER, F.Z.S., Keeper of the Zoological Department, British Museum.

[Received January 25, 1879.]

(Plates XI.—XIII.)

The Trustees of the British Museum have recently obtained by purchase a small number of animals collected in the neighbourhood of Antananarivo, the capital of Madagascar, a locality from which we should scarcely have expected to receive many novelties. However, singularly enough, the five Chamæleons sent in this collection prove to represent four species which appear to have escaped the notice of previous collectors.

CHAMÆLEON MALTHE, sp. nov. (Plate XI.)

Snout (of the adult male) produced into a flat obtuse horn of moderate length, grooved above and below, and covered with large tubercles. Occipital region rather flat, angular but not pointed behind, on each side with a broad flap, the two flaps being continuous behind the occiput. Dorsal crest low, formed by short pointed tubercles unequal in size. No gular or ventral median series of tubercles. The round flat tubercles on the occiput and the occipital flaps are unequal in size, but none very large, most nearly granular. Along each side of the throat and on the limbs larger granules may be seen scattered among the small ones; but these larger granules are almost wanting on the side of the body. Heel without spur or prominence. Greenish yellow, with white upper lip, with a black band running from the eye along each occipital ridge; the portion of the neck which is covered by the occipital flaps deep black.

A single adult male, 9 inches long, the tail measuring exactly one half.

CHAMÆLEON BREVICORNIS, sp. nov. (Plate XII. fig. A.)

Allied to *C. cucullatus* and *C. monachus*, but with the superciliary ridge continued to the end of the occiput.

The snout of the male is produced into a very short flat protuberance, concave above; the raised canthus rostralis passing uninterruptedly into the superciliary ridge, which is continued to the occiput. Upper surface of the occipital region flat, without prominent median crest. Occiput behind angular and pointed, but not produced into a spine; on each side a broad flap, the two flaps being nearly entirely separated from each other by a deep notch.



Dorsal crest very low; anterior part of the throat and the abdomen with a very low crest, formed by a double series of short conical tubercles. The occipital flaps are covered by large flat rounded scutes, much larger than those of the temple, which is crossed by an indistinct raised ridge running parallel to the occipital ridge. Sides of the throat with very indistinct longitudinal wrinkles. Body and limbs finely granular, with scattered somewhat larger tubercles. Heel without prominence. Greyish or yellowish; occipital flaps whitish; snout blackish.

A single male,  $9\frac{3}{4}$  inches long, of which the tail takes 6 inches.

CHAMÆLEON GULARIS, sp. nov. (Plate XII. fig. B.)

Allied to *C. brevicornis*.

Snout of the female not produced. The raised canthus rostralis passes uninterruptedly into the superciliary and occipital ridge, and is covered with a series of enlarged prominent reddish tubercles. Upper surface of the occipital region flat, without prominent median crest. Occiput pointed behind, but not produced into a spine; on each side a broad flap, the two flaps being separated from each other by a deep notch. Dorsal crest very low; anterior part of the throat with some isolated pointed tubercles in the median line; abdomen with a low median crest. The basal portion of the occipital flap covered with small flat tubercles, the marginal half with larger ones, of which two or three are conspicuous by their very large size. Temple crossed by a raised curved ridge. Sides of the throat with two or three longitudinal wrinkles, the bottom of which is extremely finely granular, and which are separated by rows of larger tubercles. Sides of the body and legs with numerous very conspicuous larger tubercles between the smaller ones. Heel without prominence. Yellowish, sides of the body and snout black; canthus rostralis purplish red.

A single adult female,  $8\frac{1}{4}$  inches long, of which the tail takes  $4\frac{1}{2}$  inches.

CHAMÆLEON GLOBIFER, sp. nov. (Plate XIII.)

Allied to *C. parsonii* and *C. pardalis*.

Each canthus rostralis terminates (in the male) in an erect globular protuberance in front; behind, it passes uninterruptedly into the superciliary and lateral occipital ridge; the occipital region being flat (without projecting median ridge), slanting from behind forwards, and with an obtusely rounded margin behind. No occipital flap. The spinous processes of the vertebral column form a crest, which, however, shows no denticulation, and but an indistinct serration immediately behind the head. Throat and abdomen without median crest. The sides of the body are uniformly finely granular; but the dorsal crest is covered with larger quadrangular scutes arranged in vertical series, some of which descend into the fine granulation of the side of the body. The legs, loins, and sides of the throat with numerous round flat tubercles interspersed between the fine granules; also the skin of the cheek is similarly covered. Temple very rough with

series of prominent oblong tubercles. Heel without prominence. Very dark-coloured, a more or less distinct small white spot on the middle of the side; each toe generally with a narrow white ring.

Two males, 10 inches long, the tail measuring exactly one half.

### 3. Descriptions of new Species of Rhopalocera from Central and South America. By F. DuCANE GODMAN, F.Z.S., and OSBERT SALVIN, F.R.S.

[Received January 29, 1879.]

(Plate XIV.)

The following descriptions are all taken from specimens in our collection; they relate to species many of which have long remained unnamed; to these we have added descriptions of some recent acquisitions. Figures of all the Central-American species will shortly be published.

#### EUTRESIS HYSPA.

♂. Exp. 3·9 in. Allied to *E. hyperia*, D. & H. (Gen. Diurn. Lep. i. p. 112, Suppl. Pl. f. 2): but the primaries are diaphanous where in *E. hyperia* they are fulvous; the secondaries also are almost diaphanous, the inner edge of the dark margin, especially near the anal angle, the spot at the end of the cell, and the nervules alone being fulvous. To *E. theope* (nob. P. Z. S. 1877, p. 60) it is more nearly allied, differing chiefly in the broader margin of the secondaries and the greater restriction of the fulvous on those wings.

*Hab.* Ecuador, Jorge, Guadalquiza (*Buckley*).

#### ATHESIS DEMYLUS.

♂. Exp. 3 in. Nearly allied to *Dircenna deryllidas*, Hew. (Trans. Ent. Soc. ser. 3. ii. p. 248, pl. 16. f. 4), of which it is a more southern race. The transverse markings of the primaries are very narrow, the whole of the wing being diaphanous with the exception of the dark margins, the remains of the transverse bands being represented by the dark nervules. The transverse band of the secondaries is narrower, as well as the outer margin.

*Hab.* Southern Ecuador.

We have two male specimens of this species which were sent from the confines of Ecuador and Peru some years ago. We have hesitated to describe it before being convinced of the constancy of its differential characters.

#### MELINÆA HICETAS.

♂. Exp. 3·4 in. Allied to *M. maelus* (Hew. Ex. Lep., *Mechanites*, t. 3. f. 6), but differing in the absence of yellow in the cross band of the primaries, this portion of the wing being of the same colour as the base. The apex is black, enclosing three yellowish

*HESPERIA AURIFER.*

Exp. 2.1 in. Above brownish black; two spots at the end of the cell, and a row of eight running more or less parallel from the inner margin to the costa, diaphanous, that between the first and second median branches being the largest. Beneath rich dark brown, the central portion of primaries black; the spots of the primaries as above; a row of seven golden spots across the secondaries, one at the end of the cell, six in a linear series beyond it; cilia of secondaries alternately black and white.

*Hab.* Irazu, Costa Rica (*Rogers*).

*HESPERIA SAPTINE.*

Exp. 2.2 in. Upperside deep brown, a large semidiaphanous yellow spot, divided into five by the nervules, crosses the middle of the wing from the costa nearly to the anal angle, the inner edge of this spot is deeply sinuated; apical margin of secondaries narrowly bordered with yellow. Beneath rich dark brown, the band of the primaries as above, apex enclosing three dark spots pinkish brown; outer margin, costal region, and a band crossing the wing from the middle of the abdominal margin towards the apex dark brown; the rest, including the apex, pinkish brown. Antennæ brown above and yellow beneath.

*Hab.* Irazu, Costa Rica (*Rogers*).

*HESPERIA SYRNA.*

Exp. 2.3 in. Upper surface dark brown, paler towards the apices of the primaries; the cell of the primaries, except the proximal end, a large trifid spot with deeply sinuated inner edge cut by the first and second median branches, a small trifid spot near the costa between the end of the cell and the apex, and three small spots between the apex and the cell of the secondaries semidiaphanous yellow. Beneath exactly as above; antennæ wholly brown.

*Hab.* Irazu, Costa Rica (*Rogers*).

## EXPLANATION OF PLATE XIV.

Fig. 1. *Eresia laias*, p. 151.

2. *Adelpha hypsenor*, p. 151.

3. *Pyrrhopyga arata*, p. 152.

4. — *minthe*, p. 152.

Fig. 5. *Pyrrhopyga eupheme*, p. 152.

6. — *malis*, p. 153.

7. *Hesperia polites*, p. 154.

8. — *sacra*, p. 154.

4. On a Collection of Diurnal Lepidoptera made by the Rev. G. Brown in New Ireland and New Britain. By F. DUCANE GODMAN, F.Z.S., and OSBERT SALVIN, F.R.S.

[Received January 29, 1879.]

(Plate XV.)

In the Proceedings of the Society for 1877 (page 139), we had the pleasure of describing the collection of Lepidoptera formed by the Rev. G. Brown in the neighbourhood of Duke-of-York Island. We now

bring before the Society the results of an examination of a second collection from the same source. Mr. Brown has carefully noted the island on which each specimen was obtained; so that we are enabled, to a considerable extent, to remedy a defect in our former communication. The whole of the present collection was formed on the large islands of New Britain and New Ireland, the majority of the specimens coming from the latter, a large portion of the collection from the former having met with a mishap. As we hope Mr. Brown will continue his explorations in this very promising field, it is perhaps premature to investigate in detail the difference between the butterfly faunas of the two islands. We may, however, say that there are indications of considerable differences between them. The total number of species sent us by Mr. Brown from these two islands now amounts to 60; there still remain several described by Dr. Boisduval from New Ireland which have not yet come to hand.

\*<sup>1</sup> *DANAIS AUSTRALIS*, Godm. & Salv. P. Z. S. 1877, p. 141.

New Ireland.

\* *DANAIS SOBRINA*, Salv. et Godm. P. Z. S. 1877, p. 141.

New Ireland.

3. *DANAIS PLEXIPPUS*, Linn. Mus. Ulr. p. 262.

New Ireland.

Several specimens, agreeing accurately with N.-American examples. On the range of this species see Mr. Distant's paper (Trans. Ent. Soc. 1877, p. 93), where he uses Cramer's name *D. archippus* for it.

4. \**EUPLOEA UNIBRUNNEA*, Salv. et Godm. P. Z. S. 1877, p. 141.

New Ireland.

Mr. Brown sends us a female specimen which, besides the characteristic sexual differences, is paler than the male and has the spots on the under surface rather larger.

5. \**EUPLOEA BROWNI*, Salv. et Godm. P. Z. S. 1877, p. 142.

New Britain.

A female specimen, which, except as regards the sexual distinctions, resembles the male.

6. *EUPLOEA PASITHEA*, Feld. Reis. Nov. p. 318.

New Britain.

Several examples of both sexes; they differ slightly from Ceram specimens in having all the spots on the underside smaller, and in having but a single submarginal row at the apex of the primaries.

7. *EUPLOEA ERIMAS*. (Plate XV. fig. 1.)

*Euploea erimas*, Godm. et Salv. P. Z. S. 1878, p. 733.

New Ireland.

<sup>1</sup> An asterisk prefixed to a name denotes that the species was included in our former paper.

8. \**EUPLOEA TREITSCHKII*, Boisd. Voy. Astr. Ent. p. 98.  
New Britain.

9. *EUPLOEA DUPONCHELI*, Boisd. Voy. Astr. Ent. p. 97.  
New Britain.

The examples sent have all the spots on the underside smaller than specimens thus named in the British Museum.

10. \**HAMADRYAS ÆQUICINCTA*, nob. P. Z. S. 1877, p. 142.  
New Ireland.

Several specimens, all exactly alike.

11. *MELANITIS LEDA* (Linn.), Syst. Nat. i. p. 773.  
New Ireland.

12. \**MYCALESIS LUGENS*, Salv. et Godm. P. Z. S. 1877, p. 142.  
New Ireland.

13. \**MYCALESIS MEDUS*: Salv. et Godm. P. Z. S. 1877, p. 142.  
New Ireland.

14. \**DRUSILLA ANABLEPS*, Salv. et Godm. P. Z. S. 1877, p. 142.  
New Ireland.

15. \**CYNTHIA INSULARIS*, Salv. et Godm. P. Z. S. 1877, p. 142.  
New Ireland.

Male specimens now sent agree with Moluccan examples of *C. arsinoë*.

16. \**MESSARAS WALLACII*, Feld. Reise Nov. Lep. p. 390.  
New Ireland.

Two damaged specimens doubtfully referable to this species; they differ in having the marginal band on the underside of the secondaries narrower than specimens from Mysol and Waigiu.

17. *JUNONIA IPHITA*, Cram. Pap. Ex. iii. t. 209. f. C, D.  
New Ireland.

Two very dark-coloured specimens of this variable species.

18. \**RHINOPALPA ALGINA*, Salv. et Godm. P. Z. S. 1877, p. 143.  
New Ireland.

19. \**CETHOSIA OBSCURA*, Salv. et Godm. P. Z. S. 1877, p. 144.  
New Ireland.

20. *DIADEMA BOLINA* (Linn.).  
New Ireland.

Agrees with specimens from New Guinea.

21. \**DIADEMA INEXPECTATA*, Salv. et Godm. P. Z. S. 1877, p. 144.  
New Ireland.

With additional male specimens Mr. Brown has also sent females.

These differ from the male in having the wings above dark brown instead of bluish black; the lighter blue bands of the upper surface are wanting; beneath, the irregular light band which crosses the secondaries in the male is also absent.

22. \*CYRESTIS FRATERCULA, Salv. et Godm. P. Z. S. 1877, p. 145.  
New Ireland.

23. CYRESTIS ADÆMON, sp. n. (Plate XV. fig. 2.)

♂ Exp. 2·5 in. Allied to *C. mænalis* (Erichs. Nova Acta Ac. Nat. Cur. xvi. Suppl. p. 402, t. 50. f. 3), but differs in having the common white transverse band of both wings more clearly defined and the central dark line included within it almost obsolete; the transverse white bands near the base of the wings are much less clearly defined, as are also the white markings in the broad dark margin of the primaries.

New Ireland.

24. \*MINETRA SYLVIA (Cram.).

New Ireland.

Several examples sent by Mr. Brown in this collection are doubtless referable to this species, differing in no respect from Amboyna examples. It does not, therefore, bear out our anticipation of its being a new species.

25. \*DOLESCHALLIA BROWNI, Salv. et Godm. P. Z. S. 1877, p. 145, pl. xxii. f. 3-4.

New Ireland.

26. NEPTIS VENILIA (Linn.).

New Ireland.

27. NEPTIS PRASLINI (Boisd.), Voy. Astr. Ent. p. 131.

New Ireland.

#### LYCÆNIDÆ.

28. AMBLYPODIA, sp. ?

We have received only one specimen of this *Amblypodia*, which seems closely allied to *A. araxes* (Feld. Voy. Nov. Lep. ii. p. 224, t. 29. f. 3-5).

New Ireland.

29. LYCÆNA, sp. ?

Allied to *P. hylas* of Cramer, but darker blue above.

New Ireland.

30. LYCÆNA, sp. ?

Allied to *P. elpis*, Godt., but appears to be a distinct species.

New Ireland.

31. LYCÆNA ARATUS, Cram. Pap. Ex. iv. t. 365. f. A, B.

New Ireland.

32. \**SCOLITANTIDES CLEOTAS*, Salv. et Godm. P. Z. S. 1877, p. 146.

New Ireland.

Male specimens now sent by Mr. Brown have the blue of the upper surface distributed just as in *S. excellens* (Butler), which makes it doubtful that the latter species is really distinct.

There are two other species of *Lycenidæ* in the collection which we are not yet able to determine; few of the specimens sent by Mr. Brown belonging to this family are in a sufficiently perfect state to render their determination satisfactory.

33. \**TERIAS XANTHOMELÆNA*, n. sp.

*Terias*, sp. ? Salv. et Godm. P. Z. S. 1877, p. 146.

New Ireland.

♂. Exp. 2 in. Allied to *T. candida* of Cramer; the yellow of the upper surface is of a paler sulphur-colour; the black border on the outer margin is narrower; on the costa of the primaries and abdominal margin of the secondaries it is broader. In the female the basal third of the primaries and the base and abdominal half of the secondaries, as well as the outer margin of both wings, are smoky brown.

*Obs.* Additional specimens of both sexes of this *Terias* sent by Mr. Brown confirm the differences between it and *T. candida*, to which we drew attention in our former paper.

34. *TERIAS HEBRIDINA*, Butl.

New Ireland.

35. *PIERIS LYTÆA*, Godm. et Salv. P. Z. S. 1878, p. 734.

New Britain.

36. *PIERIS EUMELIS*, Boisd. Voy. Astr. Ent. p. 50.

New Ireland.

37. *PIERIS EURYGANIA*. (Plate XV. figs. 5, 6.)

*Pieris eurygania*, Godm. et Salv. P. Z. S. 1878, p. 734.

New Ireland.

38. *PIERIS MADETES*. (Plate XV. figs. 3, 4.)

*Pieris madetes*, Godm. et Salv. P. Z. S. 1878, p. 733.

New Ireland.

39. \**ORNITHOPTERA URVILLIANA*, Salv. et Godm. P. Z. S. 1877, p. 147.

New Ireland.

40. *PAPILIO EURYPYLUS*, Linn.

New Ireland.

41. \**PAPILIO CHOREDON*, Salv. et Godm. P. Z. S. 1877, p. 148.

New Ireland.

42. *PAPILIO SEGONAX*, Godm. et Salv. P. Z. S. 1878, p. 734.  
New Ireland.
43. \**PAPILIO TELEMACHUS*?, Salv. et Godm. P. Z. S. 1877, p. 148.  
New Ireland.
44. \**PAPILIO ALBINUS*, Wall. Trans. Linn. Soc. xxv. t. 5. f. 4.  
New Ireland.
45. \**PAPILIO EUCHENOR*, Guér. Voy. Coq. t. 13. f. 3.  
New Ireland.
46. \**PAPILIO POLYDORUS*?, Salv. et Godm. P. Z. S. 1877, p. 149.  
New Ireland.

#### HESPERIDÆ.

47. \**TAGIADES*, sp.?, Salv. et Godm. P. Z. S. 1877, p. 149.  
New Ireland.

#### EXPLANATION OF PLATE XV.

- Fig. 1. Upper and underside of *Euplexa crinas*, ♂, p. 156.  
 2. Upper and underside of *Cyrestes ademon*, p. 158.  
 3. Upperside of *Pieris madetes*, ♂ ♀, p. 159.  
 4. Underside of *Pieris madetes*, ♀, p. 159.  
 5. Upperside of *Pieris eurymnia*, ♂ ♀, p. 159.  
 6. Underside of *Pieris eurymnia*, ♂, p. 159.

5. On the Heterocera in the Collection of Lepidoptera from  
New Ireland obtained by the Rev. G. Brown. By A. G.  
BUTLER, F.Z.S.

[Received January 29, 1879.]

In this series are twenty-two species, most of which are either identical with or allied to forms occurring in New Guinea and the adjacent islands. The specimens are all of them in the collection of the British Museum.

#### AGARISTIDÆ.

##### AGARISTA TYRIANTHINA, n. sp.

Primaries purplish black; a large and nearly pyriform white spot (its apex pointing towards the costal margin) across the basal portion of the median branches; apical fringe white: secondaries black, shot with brilliant purplish blue; a large patch of white occupying the whole central area from abdominal margin to subcostal vein; apical fringe white; body blackish, with orange anus; thorax shot with blue; a white line behind the eyes. Under surface nearly the same as above. Expanse of wings 2 inches.

Most nearly allied to *A. privata* of Walker, from Ceram, but dif-



fering in its more rounded primaries, the bright purple-shot colouring of the wings, the large white patch on the secondaries, the form of the single white spot of the primaries, with other slighter differences.

OPHTHALMIS LINCEA, Cramer, Pap. Exot. pl. 228. fig. B.

### LITHOSIIDÆ.

#### HYPSINÆ.

HYPSA EUSEMIOIDES, Felder, Reise der Nov., Lep. iv. pl. cvi. fig. 1, ♀.

There are three pairs of this species in the collection. The males (as usual in this genus) have the anterior wings more produced at apex than the females; the white belt on these wings also varies considerably in form and width.

HYPSA LEUCONEURA, n. sp.

Allied to *H. doryca* of Boisduval. Anterior wings greyish brown, sericeous, with all the veins white; a nearly circular white spot in the centre, cut by the median vein and its second and third branches; base ochraceous upon the veins, a bright ochreous basal spot connected with a black spot, beyond which is an angulated series of transverse black spots: secondaries white, with a broad, internally bisinuated, blackish outer border, confluent with a much narrower blackish abdominal border: body ochreous, the back of head, the collar, and tegulæ distinctly orange; palpi, antennæ, a small spot on each shoulder, and a series of triangular spots down the centre of the abdomen black. Wings below dull blackish or smoky brown, the primaries with a central white spot and a cream-coloured spot at the base; secondaries with a very broad white patch from the internal nervure to the first subcostal branch: body below ochreous; legs, with the exception of the coxæ, blackish; venter with a row of five blackish spots on each side. Expanse of wing 2 inches 2 to 4 lines.

Two males and a female.

In the earlier collection of Lepidoptera from Duke-of-York Island there was a single much rubbed and dwarfed example of this species (noted in P. Z. S. 1877, p. 149, as allied to *H. intacta*). Two of the examples in the series now sent are in very fair condition, proving the species to be most nearly allied to *H. doryca*, but darker in coloration, with white veins and a rounded instead of a comet-like spot on the fore wings, and with no black spots on the prothorax.

DAMALIS ALCIPHON, Cramer, Pap. Exot. ii. pl. 133. fig. E.

A single strongly marked female of this widely distributed species, which, since the publication of my revision of the Hypsinæ, we have received from the Andamans and New Guinea.

AGAPE LEONINA, n. sp.

Like *A. analis*, Walker (*Agape cyanopyga*, Felder, Nov. Lep. iv. pl. cvi. fig. 4), excepting that the abdomen has all the segments

bright ochreous, with lateral black cuneiform anterior borders, the second, third, and sometimes the fourth of which unite in the middle of the dorsal line so as to form transverse belts. Expanse of wings 2 inches 3 lines.

Five examples.

The anal segment in *A. analis* and *A. chloropyga* is blue-black. Of these two species, the first occurs in Ceram and Amboina, and the second at Port Macquarie (New S. Wales).

NEOCHERA EUGENIA, Cramer, Pap. Exot. pl. 398. fig. M.

The examples from New Ireland vary slightly in the inward diffusion of the blue-black border of the posterior wings, the whole interno-median area in some specimens being streaked with blue and grey.

CLEIS POSTICALIS, Guérin, Voy. Coquille, p. 286, pl. 18. fig. 5.

One female.

CLEIS LUNIGERA, n. sp.

Allied to *C. arctata*. Chocolate-brown, wings above with a faint purplish gloss; primaries with a large semicircular orange patch, almost crossing the wing in an oblique direction beyond the middle; secondaries generally with a squamose indication of an orange submarginal belt: wings below blacker than above, brilliantly shot with purple; primaries with a more golden-orange semicircular patch; secondaries with a broad submarginal orange belt, not reaching the apex; body below orange. Expanse of wings 1 inch 3 lines.

Four specimens, hardly differing in pattern.

#### NYCTEMERIDÆ.

NYCTEMERA BAULUS, Boisduval, Voy. de l'Astrolabe, p. 200, n. 5.

Four examples. The type was obtained at Bourou; there is also a specimen in the collection of the British Museum from Ternate.

DEILEMERA ARTEMIS.

*Nyctemera artemis*, Boisduval, Voy. de l'Astrolabe, p. 199, n. 4.

Occurs also in New Guinea and Ceram.

#### EUSCHEMIDÆ<sup>1</sup>.

##### MNIOCERA, n. gen.

Allied to *Craspedosis* and, less closely, to *Bursada*; from both it differs in its long slender palpi and extremely finely pectinated slender antennæ: in *Craspedosis*, as in this genus, the antennæ are rather ciliated than pectinated. Type *Oclerena cincta*, Walk.

MNIOCERA CINERESCENS, n. sp.

Blue-black: primaries with three shining silver-grey abbreviated bands across the internobasal area; a rounded white spot with a

<sup>1</sup> Always referred to the Bombycites, but in point of fact belonging to the Geometrites.

diffused silver-grey border immediately beyond the cell: secondaries with two parallel transverse silver-grey bands across the basal area; two rather narrower bands of the same colour from the anal angle to the second median branch, where they unite into a single greyish-bordered white spot, the latter again united with the costal border by a looped grey line; a grey spot close to apex; border greyish, fringe varied with white: thorax streaked and spotted with grey; abdomen with grey basal segment and a broad central orange belt. Under surface blue-black; white spot of the anterior wings slightly smaller than above, no grey markings; posterior wings with a rounded grey spot at the origin of the median branches, and two grey bands across the basal area; venter with an orange belt. Expanse of wings 1 inch 6-7 lines.

This species is very distinct from *M. cincta*. The only form in the genus *Bursada* which seems at all to approach it or *M. cincta* in character is *B. basistriga* from Mysol; but even in this form the structure of the antennæ disproves any close affinity.

*Celerena funebris* of Felder is a third species of *Mniocera*.

#### TIGRIDOPTERA INTERRUPTA, n. sp.

Pale cyaneous, the primaries with two and the secondaries with three ochraceous divergent longitudinal streaks: primaries crossed to beyond the cell by five parallel subangulated series of more or less confluent black spots, the last series interrupted by the ochreous streaks; two submarginal series of oval black spots, both series interrupted in the centre, and the outer one also at apex and external angle: secondaries with the ochreous streaks extending to the outer margin; a black stripe across the basal area; a large black spot at the end of the cell; two subangulated parallel stripes across the middle, both interrupted by the ochreous streaks; a submarginal series of black spots, also interrupted by the ochreous streaks; a single marginal black spot close to the apex: thorax greyish, spotted with black, abdomen ochreous. Wings below greyish, with black spots on the discocellulars, forming part of a blackish stripe which crosses the wings; a second similar but more arched stripe across the disk; a large white patch at centre of external area on all the wings; anterior wings with the apex white; pectus grey; venter ochreous. Expanse of wings 2 inches 9 lines.

Allied to the Australian *T. matutinata* of Walker, but differing in the interruption of the series of black spots of the upper surface, the much greater size of these spots, the absence of the ochreous outer border or the ochreous costal border in the primaries, and below in the presence of the two blackish stripes, the external area uniform in tint with the remainder of the ground-colour, but interrupted by large white patches.

#### SATURNIIDÆ.

##### COSCINOCERA, n. gen.

Allied to *Argeina* and *Attacus*; general pattern and coloration of the latter, but the posterior wings with a long tail, as in the former;

differing from both genera in its enormous sieve-like antennæ. Type *Attacus hercules*, Misk.

*COSCINOCERA OMPHALE*, n. sp.<sup>1</sup>

Ferruginous; wings crossed near the base by a rusty whitish stripe, oblique, bisinuated and angulated upon the median vein in the anterior wings, and nearly straight in the posterior wings; a second stripe of the same colour across the external third, parallel to the outer border, and slightly incurved towards the costa of anterior wings, bounded internally by a dark ferruginous or mahogany-brown stripe; outer border dull ochraceous brown; a large ocellus closing each discoidal cell, the centre formed by a white-edged triangular hyaline spot, with broad black-edged dull ochraceous iris: primaries with the ocellus elongated and subtriangular; apical area pinky white, bordered and longitudinally streaked with lake-red: secondaries with the ocellus almost circular: head and collar testaceous, the latter partially bordered behind with white; base of abdomen white. Wings below much paler and of a sordid clay-colour, brownish towards the outer border, which is testaceous; stripe across the basal area obsolete; discal stripe more distinct and whiter than above, with dark brown internal border; ocelli rather smaller than above, and with less vivid black margin: fore wings with the apical area less distinctly clouded with white; hind wings white at the base, the abdominal and external areas broadly, but not abruptly, darker than the fore wings: body testaceous, coxæ tufted with white hair; venter with lateral white line and transverse preanal white belt. Expanse of wing 9 inches 7 lines.

This species may be distinguished from *C. hercules*, Miskin (Trans. Ent. Soc. 1876, p. 7), by the redder and not black-bordered pale stripes of the upper surface, the ochraceous irides to the ocelli, and the more vivid instead of paler discal stripe of the under surface. Comparison with the Australian species will probably reveal other differences which are not apparent in Mr. Miskin's description.

*COSSIDÆ.*

*ZEUZERA SIGNATA*, Walker, Lep. Het. vii. p. 1537, n. 19.

A single example of what seems to be a slight variety of this Indian species; unfortunately the type of *Z. signata* is much discoloured and somewhat worn. When more specimens are obtained from both localities, it will be possible to determine whether or not the differences which do exist are constant; they are principally confined to the costal border of the fore wings.

*OPHIDERIDÆ.*

*OPHIDERES DIOSCOREÆ*, Fabricius, Sp. Ins. ii. p. 212, n. 15.

A worn, but unusually dark example of this form.

<sup>1</sup> The type is unfortunately somewhat damaged, and has only the commencement of the tails. A rather larger example received since the reading of this paper has tails 3 inches 9 lines in length, and less spatulate in character than the species of *Argema*.

## OMMATOPHORIDÆ.

NYCTIPAO EPHESPHORIS, Hübner, Verz. bek. Schmett. p. 272 (*Crepuscularis*, Cramer, Pap. Exot. ii. pl. clx. fig. A).

The female agrees with Cramer's figure; the males have much yellower bands and spots.

## CYDIMONIIDÆ.

NYCTALEMON PATROCLUS, Clerck, Icon. pl. 37. fig. 1.

A series of both sexes.

ALCIDIS (nec ALCIDES<sup>1</sup>) AURORA, Salvin & Godman, P. Z. S. 1877, p. 150, pl. xxiii. figs. 5, 6.

Several specimens. (New Britain.)

MICRONIIDÆ<sup>2</sup>.

STROPHIDIA URAPTERINA, n. sp.

Nearly allied to *S. astheniata* from Borneo, but constantly differing in its smaller size, the streaky stripe nearest to the external border on the fore wings almost obliterated, and the costal border only dotted with black opposite to the transverse bands, not striated, the black border of the hind wings continued to the end of the caudal process: markings below much less distinct. Expanse of wings 2 inches 4 lines.

An example from Malacca agrees with the above in size, but differs in marking precisely as do typical specimens of *S. astheniata*.

In the former consignment from Mr. Brown there was only a single example of the above; and therefore it was provisionally regarded as a variety of Guénée's species.

STROPHIDIA BIFASCIATA, n. sp.

Allied to *S. phantasmah* of Felder (Reise der Nov., Lep. iv. pl. cxxviii. fig. 40); but the costal and external borders of primaries and the submarginal band of secondaries dark olive-brown, shading externally into black; fore wings also with two central parallel straight pale olive-brown bands, the inner one of which is continued across the hind wings to the anal angle: under surface white, the costal border of the fore wings and the transverse bands obsolete, other markings paler. Expanse of wings 2 inches 7 lines.

<sup>1</sup> *Alcides* is a genus of Coleoptera characterized in 1826; it ought to be abolished, as being too close to Hübner's genus *Aleidis* (1816). Confusion has already arisen in consequence of Walker having quoted the name *Alcides* (sic) *orontiarum*, published by Hübner in his 'Sammlung exotischer Schmetterlinge,' previous to the appearance of the 'Verzeichniss,' in which the diagnosis of the genus first saw the light. It may be a question whether *Alcides* should not be preferred to the name accompanying the diagnosis; but Dr. Felder has retained the latter appellation.

<sup>2</sup> The genus *Micronia* must be restricted to *M. striataria*, *pontiata*, *convexaria*, and their allies, *M. striataria* being regarded as the type: *S. caudata* is the type of *Strophidia*, Hübner.

## STROPHIDIA CLARISSIMA, n. sp.

Allied to *S. pannata* of Felder (Reise der Nov., Lep. iv. pl. cxxviii. fig. 39). Snow-white, with black fringe; primaries with a broad subcostal stripe, and the outer border smoky brown, costal area from the margin to the edge of the stripe mottled with black; secondaries with a rather broad and regular blackish submarginal band from the apex to the second median branch, two large rounded black spots touching the outer margin on the median interspaces, a subanal transverse black dash; back of head and upper margin of palpi black; antennæ greyish brown: wings below white; fore wings with the costal margin, a subcostal spot just beyond the cell, the apex, and the external border greyish brown; hind wings with a broad triangular patch of blackish between the anal angle and the third median branch, continued beyond this branch as a submarginal greyish brown band, which runs in a straight line to the apex. Expanse of wings 2 inches 3 lines.

One example of this beautiful species.

## 6. On the Systematic Position of the Genus *Lathamus* of Lesson. By W. A. FORBES, F.Z.S.

[Received January 30, 1879]

(Plate XVI.).

In their paper on Australian birds in the Linnean Society's Transactions for 1828 (vol. xv. p. 74), Messrs. Vigors and Horsfield established a genus *Nanodes*, of which the *Psittacus discolor* of Shaw<sup>1</sup> was made the type, and full generic characters were given. Besides *Nanodes discolor*, three other species (those now generally known as *Melopsittacus undulatus*, *Euphema pulchella* and *Platycercus venustus*) were included in the genus, which was considered by its authors to be allied to *Pezoporus* and *Platycercus*, and as connecting these Australian forms with the South-American *Psittacaræ* (= *Conurus* auct.). *Nanodes* having been already used by Schönher for a genus of Rhynchophorous Coleoptera<sup>2</sup>, Lesson<sup>3</sup> substituted for this name that of *Lathamus*, including under that head four other species (one a *Euphema*, one a *Cyanorhamphus*, and two *Trichoglossi*, as now understood), remarking that Swainson "a parfaitement établi ses caractères" in his 'Zoological Illustrations,'<sup>4</sup> where, however, *E. pulchella* is considered the type of the genus<sup>5</sup>. As will be seen from

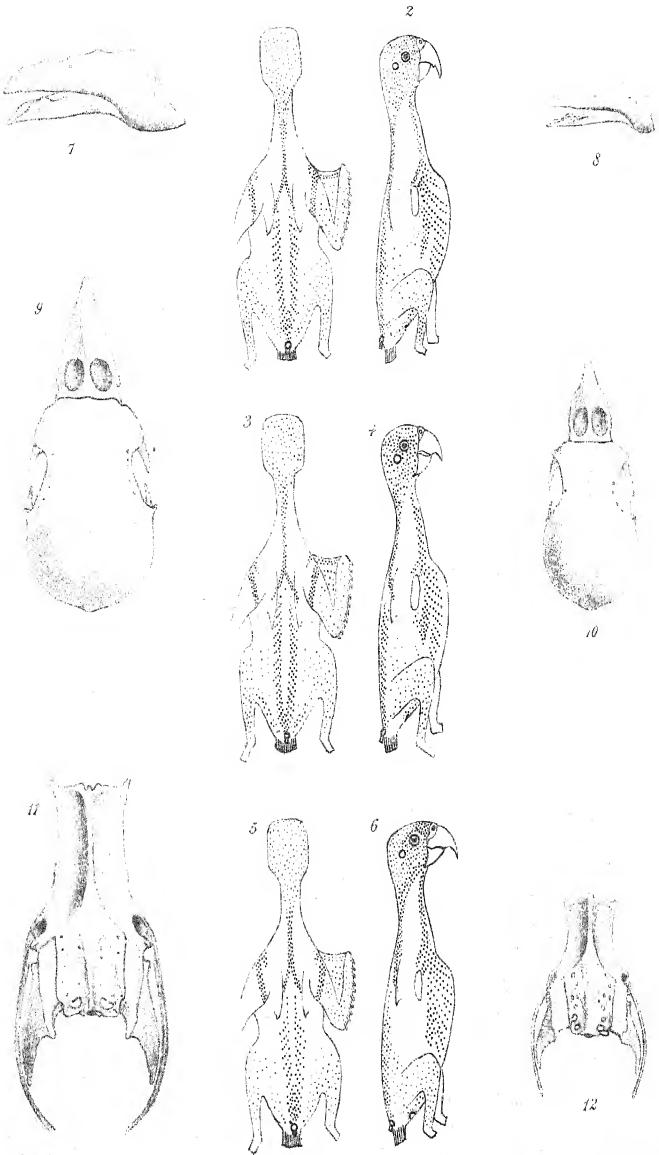
<sup>1</sup> White's Voyage, pl. 263 (1790). For the synonymy of the species, see Finsch, Papag. ii. p. 863.

<sup>2</sup> Schönh. Oureul. Disp. Meth. p. 322 (1826).

<sup>3</sup> Traité d'Orn. p. 205 (1831).

<sup>4</sup> 2nd series, vol. i. part 5, no. 21 (1829).

<sup>5</sup> Swainson, however, in his 'Classification of Birds' (vol. ii. p. 304, 1837), makes *Lathamus* a member of his "subfamily Platycercinae," in which he also includes *Coracopsis*, *Pezoporus*, *Platycercus*, and *Calopsitta*, with the remark that it is a "subtypical" form.



J. Smith lith.

Hanhart imp.

STRUCTURE OF LATHAMUS.





the species associated with it, all these authors were evidently puzzled by the characters of this peculiar little Parrakeet; and the same seems to have been the case with all subsequent naturalists who have treated of it. The majority, however, seem to have considered that it had *Trichoglossine* affinities.

Thus Bonaparte<sup>1</sup> included *Lathamus* as “dernier des *Trichoglossiens* ;” and Gould, likewise acknowledging the validity of the genus, places it amongst the *Trichoglossidæ*. He says:—“Having had ample opportunities of observing the bird in a state of nature, I concur in the propriety of separating it into a distinct genus; in its whole economy it is most closely allied to the *Trichoglossi*, and in no degree related to the *Euphemæ*” (Handb. B. Austr. ii. p. 89). Dr. Finsch, in his great work on Parrots<sup>2</sup>, after a careful examination of its peculiarities, came to the conclusion that these were not sufficient to justify its separation as a distinct genus, and included it as a *Trichoglossus*. More lately, the same position (*i. e.* that of a member of the family *Trichoglossidæ*) has been assigned to it by Gray<sup>3</sup>, Sclater<sup>4</sup>, Wallace<sup>5</sup>, and others. On the other hand, Sundevall in his ‘Tentamen’<sup>6</sup> placed it in his fourth family “*Platycercini*,” remarking, “*Hæc species, plerumque cum sp. Trichoglossinis (Ps. concinno &c.) consociata, vera tamen est species Platycercina, maxillâ inferiori tumidâ, &c, Euphemæ maxime affinis.*” In his paper on the anatomy of the Parrots, Prof. Garrod<sup>7</sup> shows that *Lathamus* differs from *Lorius* and its allies in having a superficial left carotid, a feature common to it and *Platycercus*, *Psephotus*, &c., from which, however, it differs in the possession of a furcula<sup>8</sup>. He further says:—“It may at first sight seem very heretical to remove *Lathamus* from the *Loriinæ*, the brush-tongue being considered characteristic of that subfamily. To the unbiased student, however, the brush-tongue is a character not more important than several of those that have been above considered. . . . The character of the papillæ is somewhat different in *Lathamus* from what it is in *Lorius*, they being blunter and shorter in the former genus than in the latter.”

Having undertaken at Prof. Garrod’s suggestion an investigation of the pterylosis of the Parrots, the results of which I hope to communicate to this Society at no distant date, *Lathamus* was one of the first forms I examined; and I at once saw that its pterylosis confirmed the relationship of this form to the *Platycercinæ* already insisted on by Sundevall and Garrod. From this I was led to an examination of some other parts of its structure; and I propose to lay the

<sup>1</sup> Compt. Rend. xlv. p. 536 (1857).

<sup>2</sup> Pap. ii. p. 863 (1868).

<sup>3</sup> *Trichoglossus*, c. *Nanodes*, gen. no. 2047, Hand-l. B. ii. p. 156 (1870).

<sup>4</sup> List. Vert. 6th ed. p. 269 (1877).

<sup>5</sup> Geogr. Distrib. Animals, ii. p. 327.

<sup>6</sup> *Methodi Naturalis Avium disponendarum Tentamen*, p. 71 (1872).

<sup>7</sup> P. Z. S. 1874, p. 586.

<sup>8</sup> M. Blanchard, indeed, says (Compt. Rend. 1857, xlv. p. 521) that *Lathamus* has no furcula; but this bone is present, though small and weak, in the mens I have seen: cf. also Owen, Cat. Ost. Ser. R. C. S. i. p. 279 (1853).

results of my inquiries before the Society to-night, in order to establish the view that *Lathamus* must be removed from the brush-tongued *Trichoglossinæ*, with which it has been so generally associated, and must be considered a (no doubt aberrant) member of the *Platyercine* group.

The pterylosis of this form having first struck my attention, I will describe this in the first instance, the more so as, as far as I know, no description of this part of the structure of the bird in question has yet been published. I may perhaps anticipate part of my paper on the pterylosis of the *Psittaci* in general, and point out briefly the general characters of the distribution of the feathering in these birds, so as to enable the reader without any further trouble to appreciate the points of distinction in this respect between *Lathamus* and the other species with which I have compared it.

As will be evident from the figures (Pl. XVI. figs. 1-6), the tracts of contour-feathers in a Parrot may be arranged as follows:—On the upper surface of the body, continuous in front with the feathering of the top and sides of the head, is a long narrow tract, the “superior tract,” which divides behind in the interscapular region in a fork-like manner, forming the “scapular fork.” Behind this, occupying the hinder part of the back and pelvis, is another, more or less Y-shaped tract, with the “handle” (which is usually short) of the fork placed close to the posterior extremity of the trunk, whilst the more lengthy “arms” of the Y are more anterior, and run in, in front, between the corresponding ones of the “scapular fork,” usually becoming very feebly feathered in so doing. This tract may be called the “dorso-lumbar” fork. Scattered more irregularly and diffusely over the sides of the pelvis, and external to the last-named tract, is the “lumbar feathering,” which passes posteriorly on each side into the narrower but more distinct “femoral tracts.” These are continued onto the legs as far as the tarsi as the “crural tracts,” clothing the legs in a trouser-like way. On the inferior surface, on each side, is a continuous tract, running from the upper part of the neck (where it may or may not unite with its fellow of the opposite side), over the breast and abdomen, to the anus. This “inferior tract,” besides one or two small branches running towards the humerus and patagium (the first and second “humeral tracts”), gives off, at about the commencement of the sternum, a more or less separate and well-marked external branch, the “outer pectoral” tract, which runs down more or less parallel to the main part of the inferior tract for a little way, but ceases before the thighs.

Amongst the various species of *Psittaci* I have examined, well-marked differences in some of these tracts occur, more particularly in the arrangement of the “dorso-lumbar fork,” and the greater or lesser development of a distinct “outer pectoral” branch to the inferior tract.

In *Lathamus discolor* (Pl. XVI. figs. 1, 2), the inferior tract of each side starts from about the angle of the jaw, and does not unite with its fellow. On the sternum it is about eight or nine feathers broad at

the widest part, the feathering being rather strong and not close. As in most Parrots, there are two humeral tracts. The space on the carina sterni between the inferior tracts of the two sides is not wide. There is a well-marked outer pectoral tract, about 1 inch long, distinguished by its rather stronger and closer feathering. It is quite separate from the main part of the inferior tract, the space between the two tracts being about as broad as the latter tract itself. The outer pectoral has the appearance of being somewhat dilated at its free end, owing to the presence of a few irregularly placed and small feathers lying to the outside of its termination. The main part of the inferior tract is rather narrow, with its rows of four and five feathers each separated by rather considerable spaces.

The scapular fork is rather long, the tracts being narrow and moderately strongly feathered.

The dorso-lumbar fork is elongated; each arm is of nearly the same strength and breadth throughout, beginning a little outside the scapular fork, with the part inside the arms of the latter represented only (as usual in the Psittaci) by one or two rows of small feathers, placed singly or in pairs. Each arm is composed of about fourteen rows of feathers (counting to the junction with its fellow), the rows being four feathers wide, rather close together, and of about the same width as the space between the tracts. There is some tendency in some of the anterior rows towards a dilatation of the tract, one or two of the rows being five feathers wide. In the more anterior parts of each arm, the most internal feather of each row is often placed in front of and at an angle with the other feathers composing it, and so comes to stand between two rows of three feathers each; so that at first each tract looks as if made up of rows of three (or four) feathers alternating with single feathers. This tendency to a 3.1.3 arrangement, however, disappears in the the more posterior parts of the tracts, the four feathers of each row there standing in a direct line with one another. The two arms unite to form the "handle" at about three quarters their entire length; after the junction the tract narrows rather rapidly towards the tail. The dorso-lumbar fork is throughout quite distinct from the lumbar feathering, which is very weak and diffuse.

In all the truly *Platyercine*<sup>1</sup> forms that I have examined—namely *Platyercus eximius* and *pennantii*, *Psephotus hæmatogaster* (four specimens) and *P. hæmatonotus*, *Pyrrhulopsis splendens* and *P. personata*, *Cyanorhamphus auriceps* and *C. novæ-zealandiæ*—the disposition of the outer pectoral tract and dorso-lumbar fork resembles essentially that of *Lathamus*. In all the outer pectoral is a distinct, more closely feathered, and rather narrowish tract, clearly separated throughout from the main part. In *Cyanorhamphus* this tract is distinctly hook-like, dilated at the end. In all the same length<sup>2</sup>, and uniformity in strength and width, of the arms of the dorso-lumbar

<sup>1</sup> I. e. excluding *Aprosmictus*, *Polyteles*, *Euphema*, *Pezoporus*, &c.

<sup>2</sup> In *Pe. pennantii*, and in the two species of *Pyrrhulopsis* I counted fourteen, in *C. auriceps* thirteen, in *Ps. hæmatonotus* thirteen, and in *Ps. hæmatogaster* eleven rows of feathers in the arms of this tract to their junction.

tract is observable, the inclosed space being of about the same width as either of the tracts inclosing it, no tendency to a dilatation of the arms *at their junction* (though there is some in front) being present, and the rows of feathers in front having a more or less clear 3.1.3 arrangement. The lumbar feathering is always very weak; so that the boundaries of the dorso-lumbar fork are very clearly defined. *Lathamus*, however, differs from the above-mentioned forms a little by its longer and not so widely divaricated scapular fork, and by the greater breadth of its inferior tract on the sternum, thereby causing a corresponding diminution in the breadth of the carinal space. The general agreement, however, of the pterylosis in the two types will, I think, at once be evident from the figure of *Lathamus* (Pl. XVI. figs. 1, 2), and that of *Platycercus pennantii* (Pl. XVI. figs. 3, 4), which I have represented next to it for the sake of comparison.

If now we turn to the *Trichoglossinæ*<sup>1</sup> (See Pl. XVI. figs. 5, 6), in which so many naturalists have included *Lathamus*, we shall find important and well-marked differences in the two tracts mentioned above, though the general character of the pterylosis remains the same in all<sup>2</sup>. The outer pectoral tract is never so narrow and distinct here as it is in *Lathamus* and its allies; it is usually almost triangular in shape, and so tolerably broad, shorter, and not so divergent, the interspace between it and the main tract being much narrower, and frequently with a few scattered feathers in it uniting the two tracts together. The inferior tract on the breast is always much broader, and the carinal space narrower.

Still better-marked characters between the two groups are to be seen in the disposition of the dorso-lumbar fork. This in all the *Trichoglossinæ* is extremely weak in front, the tracts not getting at all strongly feathered till some way (in *T. concinnus*  $\frac{1}{2}$  inch) from the ends of the scapular fork. Each arm is much shorter (in all the forms I count about eight rows of feathers to the junction), wider and more diffusely feathered than in the *Platycercinæ*, and becomes dilated and more strongly feathered towards its junction with its fellow, which takes place further from the tail than in the other group. The united tract is strongly feathered and rather broad at first, but narrows rapidly again towards the tail. Figs. 5 and 6, Pl. XVI. represent the pterylosis of *Trichoglossus concinnus* (a bird a little larger than the "Swift Parrakeet"), and show the differences between the two groups, which, if somewhat slight, are nevertheless easily appreciable after a little study, and are as well marked as any others I have as yet observed in the pterylosis of this order.

Several points in the external characters of *Lathamus* show that

<sup>1</sup> Of these I have examined the pterylosis in *Eos rubra*, *Trichoglossus ornatus*, *hematodes*, *swainsoni*, *concinnus* (two specimens), and *pusillus*, and *Coriphilus fringillaceus*.

<sup>2</sup> I have as yet been unable to confirm Nitzsch's observation (Pterylogr. Eng. edit. p. 100) that in *Lorius garrulus* and *L. domicella* the inferior tracts are continuous over the lower surface of the neck.

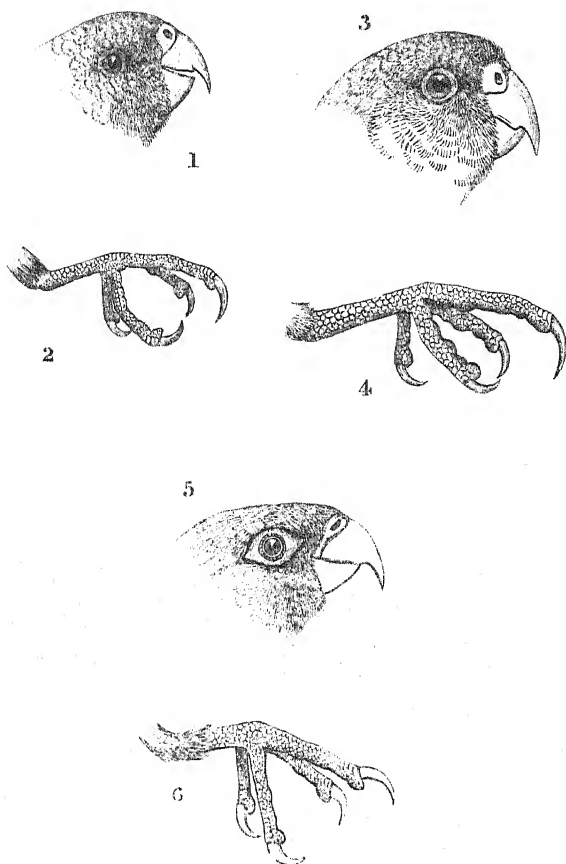


Fig. 1. Head of *Lathamus discolor*.

Fig. 2. Foot of ditto.

Fig. 3. Head of *Psephotus haematogaster*.

Fig. 4. Foot of ditto.

Fig. 5. Head of *Trichoglossus concinnus*.

Fig. 6. Foot of ditto.

it has in fact no particular relationship to the *Trichoglossinæ*. The shape of the upper mandible, with a small but distinct tooth, is obviously (see fig. 1, p. 171) much nearer to that of *Psephotus* (fig. 3) than it is to that of a Lory (fig. 5). The same story is told still more plainly by its maxilla, which has none of the laterally compressed, elongate, and pointed form characteristic of the Lories, and which induced Sundevall to divide all Parrots into two groups "*Psittaci proprii*" and "*Psittaci orthognathi*," the latter including only the Lories and *Nestor*, and characterized by having the "*maxilla inferior recta, angusta, altitudine longior*." In *Lathamus* the maxilla is short and deep, with a broad and rounded anterior margin. These differences will be seen by a glance at figures 5 and 1, representing the heads of a *Trichoglossus (concinus)* and of *Lathamus*.

In all the *Trichoglossinæ* I have examined, the cere is rather narrow from before backwards, the anterior margin only sinuate, and the nostrils elongated and ovate, with their long axis directed forwards and *inwards*, and so somewhat *transversely* to the direction of the beak (fig. 5, p. 171). This is very evident in the living birds, and is also to be made out in skins. In *Lathamus*, however, and the *Platyercinæ* generally, the cere is much larger, with the anterior border on each side nearly semicircular; and the nostrils are oval and directed *upwards*, more nearly parallel with the culmen (see figs. 1 and 3).

In the small size of the nude orbital ring *Lathamus* agrees with the *Platyercinæ* rather than with the Lories, in which it is of fair size and rather conspicuous in the living birds.

In the shape of the wings, no doubt, *Lathamus* is somewhat aberrant, and nearer the Lories than the *Platyercæ*. This is, however, so obviously an adaptive modification, due to the swift flight and arboreal habits of both these birds as compared with the more ground-loving mode of life of the *Platyercæ*, that no stress can be laid on it as a taxonomic character. The *rounded* end of the wing-feathers, however, of *Lathamus* still point to its *Platyercine* affinities. Its feet, too, though not typically *Platyercine*, differ from those of the *Trichoglossinæ* (cf. figs. 2 and 6, p. 171) by their more elongated and slender tarsi and toes, with the latter not so much flattened and fitted for grasping branches, &c., as are those of the Lories, and with the claws not so strong and longer, particularly that on the third digit. In both these points more resemblance to the *Platyercæ* is shown (cf. fig. 4, p. 171, foot of *Psephotus hæmatogaster*), though the different modes of life<sup>1</sup> have here again induced a certain amount of change from the form observed in the truly terrestrial *Platyercæ*.

A thorough study of the osteology of the Parrots has yet to be

<sup>1</sup> Mr. Gould says ('Handb. B. Austr.' ii. p. 89):—"In its actions and manners it is closely allied to the *Trichoglossi*, but differs from them in some few particulars, which are more perceptible in captivity than in a state of nature. It has neither the musky smell nor the jumping motions of the *Trichoglossi*. I have never observed it alight on the ground, or elsewhere than among the branches."

made; and till that is done it is perhaps somewhat premature to generalize. Nevertheless, having examined somewhat carefully a considerable number of the skeletons of the two groups with which *Lathamus* has been generally associated, I have, I believe, been able to detect certain differences which will help us in referring the bird at present under discussion to its proper place.

First, as regards the skull. This, in all the *Trichoglossinæ*, is remarkable for its somewhat depressed form and the lateral compression and elongation of the upper and lower jaws, the mandible when deprived of its horny sheath showing even more clearly the peculiar shape of the lower jaw in these birds, first pointed out by Sundevall and already alluded to above (Pl. XVI. fig. 7). In the *Platyceerci* the skull is less depressed above and much shorter in proportion, and the mandible is not pointed, but has its symphysial portion wide, deep from above downwards and somewhat truncated. The same is the case in *Lathamus* (Pl. XVI. fig. 8).

In the Lories the lengthening of the beak has led to a similar elongation in the anterior limb of the palatine bones, so that this part is as long as, or longer than, the posterior one; and the latter is considerably shorter than the pterygoids. In the *Platyceerci* the anterior part of the palatines is not so elongated; but, on the contrary, the posterior limb is somewhat lengthened, and, in fact, nearly as long as the pterygoids. Here, again, *Lathamus* agrees more with the *Platyceerci*.

In the Lories (Pl. XVI. fig. 9, *Eos rubra*) the anteorbital processes are much larger and better-developed than in the *Platyceerci*, where the hinder margin of these parts, as seen from above, is not very far from being on a level with the cranio-rostral suture, and so causes the orbits to take up a larger part of the surface of the skull (in a view from above) than in the other group. The same is the case in *Lathamus*<sup>1</sup> (Pl. XVI. fig. 10).

The retention of the furcula is no doubt associated with the rapidity of flight of this bird, whilst in the more slowly moving *Platyceerci* it has disappeared almost entirely. As we already know from M. Blanchard's researches (Ann. Sci. Nat. Zool. xi. pp. 84-85, 1859), but little assistance as regards classification can be gained in this group from a study of the sternum.

The pelvis, however, has been of more use to me.

In the Lories this is always elongated and narrow in proportion, the preacetabular part being particularly elongated, and the iliac fossæ on each side for the attachment of the gluteal muscles being deeper and more extensive. In the *Platyceerci* and *Lathamus* the

<sup>1</sup> Bonaparte (Compt. Rend. xlv. p. 536, 1857), following Owen (Cat. Osteol. Series R. C. S. 1853, p. 279, no. 1451), says that in *Lathamus* the orbit is completed below by the junction of the lacrymal with the "mastoid." This is certainly not the case in a skull lent to me by Professor Garrod, and, if true, would be an anomaly for any member of either of the above-mentioned groups. In the specimen referred to in the Museum of the College of Surgeons (no. 1451) it appeared to me on examination that there was in reality no bony union between the two bones, which were connected simply by ligament.

pelvis is wider, the preacetabular part much shorter, and the iliac fossæ shallower and smaller. These differences will be visible from the figures which I exhibit (Pl. XVI. figs. 11, 12), in which are shown respectively the pelvis of *Lathamus* and of *Lorius tricolor*.

As regards internal anatomy, little can be said of any important characters, except the difference in the disposition of the carotid arteries in the two groups, first pointed out by Prof. Garrod, and already mentioned above. The nature of the tongue in *Lathamus* requires reexamination, as also does the coloration of the eyes, this presenting very marked characteristics in all those *Trichoglossinæ* I have been able to examine alive (of the genera *Lorius*, *Eos*, *Chalcopsitta*, and *Trichoglossus*), and being quite unlike that prevalent in the *Platycerci* and most other Parrots.

In coloration *Lathamus* is no doubt aberrant, but is no more clearly related, as far as I can see, to one group rather than the other. The external rectrices being blue is perhaps a hint of its *Platycercine* relations.

To conclude, the more important characters of *Lathamus*, *i. e.* pterylosis and superficial left carotid, beak, nostrils, cere, feet, skull, and pelvis, all point to a near relationship to *Psephotus*, *Platycercus*, and allied genera. The abnormal tufted tongue, the retention of the furcula, and the sharp pointed wings may be regarded as adaptations to its tree- and flower-loving modes of life, and not as due to any consanguinity with the *Trichoglossinæ*. *Lathamus* may be a more or less modified remnant of a group that branched off from the common stock with the progenitors of the more typical *Platycerci*, and of which all the others have become extinct (perhaps due to the competition with the more specialized *Trichoglossinæ*); or it may be a member of the *Platycercine* group that has become specialized to modes of life like those of the true Lories and Lorikeets, and so has come to resemble them in some few superficial particulars.

#### EXPLANATION OF PLATE XVI.

- Figs. 1, 2. Back and side views of *Lathamus discolor*, showing pterylosis.  
 3, 4. The same of *Platycercus pennantii*.  
 5, 6. The same of *Trichoglossus concinnus*.  
 7. Mandible, deprived of horny sheath, of *Eos rubra*.  
 8. The same of *Lathamus discolor*.  
 9. Skull, seen from above, of *Eos rubra*.  
 10. The same of *Lathamus discolor*.  
 11. Pelvis of *Lorius tricolor*.  
 12. The same of *Lathamus discolor*.



7. A Note on *Heliodilus soumagnii*, Grandidier. By R. BOWDLER SHARPE, F.L.S., F.Z.S., &c., Department of Zoology, British Museum.

[Received February 4, 1879.]

The British Museum has recently acquired a skin of *Heliodilus soumagnii* from Mr. Higgins, of 22 Bloomsbury Street. This very interesting specimen, which I now exhibit, was obtained in the neighbourhood of Antananarivo, and formed part of the same small consignment as the new *Dromæocercus*, which also lies upon the table. The genus *Heliodilus* is of very great interest to ornithologists, as having formed the subject of an important communication by Prof. Alphonse Milne-Edwards to the French Academy ('Comptes Rendus,' Dec. 1877); and I have had great pleasure in receiving such a desideratum for our national collection, which gives me the opportunity of comparing together *Strix*, *Phodilus*, and *Heliodilus*.

In my 'Catalogue of Birds' (vol. ii. p. 289) I separated the *Strigidae* as a separate family from the *Bubonidae*, and included in the first-named family the Barn-Owls and the *Phodili*, reserving every other Owl for the family *Bubonidae*, which, of course, greatly predominates in number. I take the present opportunity of acknowledging an oversight, which was unintentional on my part; and that was, not to have mentioned in the 'Catalogue' that the institution of these two principal groups was derived from Messrs. Sclater and Salvin's notes, as published in Professor Newton's edition of Yarrell's British Birds—a fact that should have been stated at the time.

In a previous communication made by Professor Alphonse Milne-Edwards to the French Academy of Sciences on Dec. 17, 1877, he shows that in the form of its sternum and in other peculiarities of the skeleton, *Phodilus* is one of the *Bubonidae*, and suggests that it comes near *Syrnium*. It is curious that every author has placed the genus near the Barn-Owls, to which the form of the facial disk and the red plumage somewhat assimilate it. On reexamining our specimen of *Phodilus*, I also perceive that an important external character, the serration of the inner edge of the middle claw, is wanting; and thereby further evidence is afforded of the correctness of Prof. Milne-Edwards's remarks. From the shape of its nostril, ear-conch, and facial disk, the genus *Phodilus* appears to be nearly allied to *Scops*.

The new genus *Heliodilus* looks at first sight very much like *Phodilus*, as the typical species *H. soumagnii* is a red bird of the general aspect of the Bay Owl (*Phodilus badius*). On a more careful examination, however, the bird will be found to possess the serrated claw of a Barn-Owl; and this, with the careful description of the osteology given by Professor Milne-Edwards, conclusively shows that the family of the Barn-Owls, reduced to a single genus *Strix* by the abduction of its time-honoured ally *Phodilus*, ought to be compensated for the loss by the addition of the still more remarkable *Heliodilus*.

In external appearance *Heliodilus* is very similar to *Strix*, but has the toes almost perfectly bare, without any of the hairs which are found on the feet of a Barn-Owl. A more important difference is exhibited in the shape of the wings in the two genera, which may be thus diagnosed :—

- a.* Wings very long, surpassing the end of the tail. .... *Strix*.  
*b.* Wings shorter and much more concave, falling short of the tail  
 by as much as the length of the outer toe and claw. .... *Heliodilus*.

The following is a description of the specimen in the British Museum :—

#### Genus *HELIODILUS*.

*Heliodilus*, Alph. Milne-Edwards, C. R. 1877, Type.  
 (Dec.) ..... *H. soumagnii*.  
*Range*. Confined to Madagascar.

#### *HELIODILUS SOUMAGNII*.

*Heliodilus soumagnii*, Grandid. Bull. Soc. Philom. Paris (7), ii. p. 66 ; id. C. R. 1877 (Dec. 31).

*Adult*. General colour above bright cinnamon-rufous, slightly varied with scantily distributed blackish spots, very small, of an arrow-head shape, and varying in number from two to five, the sub-terminal one alone being distinct ; head and mantle a little more closely spotted than the rest of the upper surface, with the exception of the inner greater coverts and inner secondaries ; wings cinnamon-rufous, with faintly indicated black bars on some of the greater coverts, the quills are regularly banded with black on their inner webs ; tail light cinnamon-rufous, crossed with narrow and incomplete black bars, of which six can be noted, without including a triangular black spot near the end of the tail ; a complete ruff of deep-cinnamon feathers, with buffy-white bases to the feathers ; facial disk deep vinaceous, lighter on the lower margin, where the feathers are fulvescent on their bases ; entire under surface of body light cinnamon, uniform, with the exception of small dusky spots on the fore neck and chest, with here and there a spot on the flanks and under wing-coverts, which are deep cinnamon ; quills pale cinnamon below, with bars of black on the inner webs ; leg-feathers deep cinnamon-rufous, extending down the entire hind leg, and becoming more and more scanty on the fore part of the tarsus just above the toes ; bill ivory white, the lower mandible yellower. Total length 12·8 inches, culmen 1·45, wing 8·5, tail 4·1, tarsus 2·1.

*Hab.* Neighbourhood of Antananarivo and Tamatave (*Mus. Paris*), Madagascar.

8. On a second Species of *Dromæocercus* from Madagascar.  
By R. BOWDLER SHARPE, F.L.S., F.Z.S., &c., Department  
of Zoology, British Museum.

[Received February 4, 1879.]

In the same collection as the *Heliodilus*, described in the preceding paper, there were several specimens of a Feather-tailed Warbler belonging to the genus *Dromæocercus*, instituted by me in January 1877\*. On comparing the birds recently sent with the type of *Dromæocercus brunneus*, it is evident that they belong to a different species, for which I propose the name of *Dromæocercus seebohm*, after my friend Mr. Seebohm, who is now associated with me in the 'Catalogue of Birds.' Of this he is about to prepare the volume on the Thrushes and Warblers, with which two groups he has shown already such a good acquaintance.

DROMÆOCERCUS SEEBOHMI, sp. n.

*D. similis D. brunneo et ejusdem formæ, sed corpore supra maculato nec concolori, plumis brunneis medialiter obscurioribus et gutture albo, brunneo striato, distinguendus.*

General colour above dark brown with edges of lighter brown, producing a mottled appearance, the rump and upper tail-coverts more uniform; tail-feathers rufous-brown with stiffened black shafts, the feathers loose-webbed, as is usual in this genus; wing-coverts and quills blackish brown, margined with lighter brown; lores whitish; ear-coverts and sides of neck ashy brown; under surface of body dull white, shaded with ashy brown on the sides of the breast; sides of body and under tail-coverts rather more fulvous-brown; fore neck with small but distinct spots of dusky brown, the sides of the body more largely and distinctly streaked; under wing-coverts ashy brown, the edge of the wing white; quills dull brown below, fulvescent along the edge of the inner web. Total length 5·9 inches, culmen 0·4, wing 1·95, tail 3·1, tarsus 0·7.

*Hab.* Neighbourhood of Antananarivo, Madagascar.

Some of the specimens exhibit less mottling on the back than others; but it is always more or less strongly characterized, as also is the light-coloured throat, which has the stripes more distinctly indicated in some specimens than in others. Since describing the original specimen of *Dromæocercus brunneus*, I have seen several others collected by the late Mr. Crossley; and with some of these, in Mr. Seebohm's cabinet, I have compared the series of the new species.

\* P. Z. S. 1877, p. 22, pl. ii. fig. 2.

9. Descriptions of two supposed new Species of South-American Birds. By A. BOUCARD, C.M.Z.S.

[Received February 4, 1879.]

(Plate XVII.)

1. *CHIROMACHERIS CORONATA*, n. sp. (Plate XVII.)

Head black encircled by yellow feathers forming a coronet; back, tail-, and wing-coverts silky black; wings and tail brownish black, paler internally; throat and breast black; abdomen and under tail-coverts grey with a whitish spot in the centre of each feather, but this can only be seen by separating the feathers; under wing-coverts white with yellow edges; bill on the upperside black, paler underneath; feet yellow.

Total length  $3\frac{1}{2}$  inches, bill  $4\frac{1}{2}$  lines, wing 2 inches 3 lines, tail 1 inch.

*Hab.* Columbia. *Mus.* Boucard.

The present bird is the seventh of this interesting genus, and cannot be confounded with any of the other species. The single specimen, from which the figure is taken, is a fine male, and came in a large collection of birds sent from Bogota.

2. *LAMPORNIS VIOLICAUDA*, var. ?

Upper surface purplish black, lighter on the rump; tail-coverts and central tail-feathers black; lateral tail-feathers metallic purple, with the tip and external edge of each feather dark blue; chin and breast black, with a line of lustrous purplish black feathers commencing at the angle of the bill and passing down the sides of the neck; abdomen black in the centre, paler on the sides, with a line of white feathers on each side as in *L. violicauda*; under tail-coverts purplish black; bill and feet black.

Total length 4 inches 2 lines, bill 9 lines, wing 2 inches 6 lines, tail 1 inch 5 lines.

*Hab.* Brasilia. *Mus.* Boucard.

I have only one male specimen of this bird. It is closely allied to *L. violicauda*, from which it differs chiefly in its colour. Possibly it may be a melanism of that species.

10. On the Identity of *Trigla pæcilopectera* and *T. hirundo*.  
By FRANCIS DAY, F.Z.S.

[Received February 17, 1879.]

(Plate XVIII.)

While at the Westminster Aquarium in the month of October last year, my attention was drawn to some small but beautiful Gurnards that had recently been obtained from Southend. The colours on the inner side of their pectoral fins did not coincide with that shown in any British example; and the presence of a large, black, oval blotch, covered with light blue spots, seemed to render it probable that they might be the "Little Gurnard" (*Trigla pæcilopectera*)—a species which neither Yarrell nor Couch were so fortunate as to obtain<sup>1</sup>. I therefore asked Mr. Carrington, the naturalist to that establishment, to preserve any examples that died, in order that I might have the opportunity of ascertaining, first, if they belonged to the species I supposed, and, secondly, if such specimens were or were not the young of another form. I have now to record my thanks to Mr. Carrington for six excellent examples of the "Little Gurnard" (varying from 2·0 to 9·8 inches in length), which, so far as I am aware, has not previously been recorded from the waters of Great Britain, although a fish two inches in length has been reported to have been captured in Ireland, but, as I shall presently show, was either wrongly identified or erroneously described.

This fish has been recorded in several works (Cuv. & Val. iv. p. 47; Thompson, P.Z.S. 1837, p. 61; Yarrell, Brit. Fishes, i. p. 49; Demid. Voy. Russ. mérid. iii. p. 375; Guichen. Explor. Algér. Poiss. p. 39; Günther, Catal. ii. p. 203; Couch, Brit. Fishes, ii. p. 36, pl. lxx. f. 2?). Some of the authors have personally examined specimens; others have copied their descriptions from previous writers; but all coincide in the statement that it has not been taken upwards of 4 inches in length.

I do not propose giving a detailed account of the species, as such may be found in Cuv. & Val. To what is there recorded I will, however, add that it has ten cæcal appendages, and that the number of spined plates along the bases of the dorsal fins is from 25 to 26 on either side, a not uncommon number in the species of this genus.

At 5½ inches in length the various spinate projections on the head, shoulder, and along the bases of the dorsal fins become more blunted, the colours on the body are not so vivid, while the oval black blotch with blue spots on the inner side of the pectoral fin is more decidedly blue, covered with white spots. If an example, coloured as in *T. hirundo*, of the same size is placed alongside, scarcely any differences are perceptible; the number of spinate elevations along the bases of the dorsal fins, of the fin-rays, of the rows of scales, and the proportions of the various parts of the body are the same.

<sup>1</sup> Yarrell gave a figure of this fish in his second edition from a French drawing.

I have found, however, 10 cæcal appendages in *T. pæcilopectera*, whereas in Cuv. and Val. *T. hirundo* is said only to possess 8. But on reexamining this point, I find my examples of the latter fish also have 10; consequently this feature may be subject to individual variations. Until I possess more examples I shall be unable to ascertain the number of vertebræ, or make detailed investigations as to the sexes.

The air-vessel in the various species of this genus afford excellent characters for discrimination; so I have been careful in ascertaining what its appearance is like in *T. pæcilopectera*. At  $5\frac{1}{2}$  inches it is oval, with two short projections anteriorly, one on either side, and behind them laterally is a short tube, which does not extend backwards along the outer side of the air-vessel more than one fourth of its length. In another example of the same dimensions these lateral prolongations extended backwards about one half of the length of the air-vessel on either side; and in my largest example (9.8 inches in length) they nearly reach its posterior extremity.

Among the British species of *Trigla* destitute of elongated fin-rays (such as *T. obscura* Linn.), three have the lateral line armed or roughened, viz. *T. lineata*, Ray, *T. gurnardus*, Linn., *T. cuculus*, Bloch; but as the lateral line is smooth in *T. pæcilopectera*, any immediate relationship between these forms is excluded. Those with the lateral line smooth are *T. pini*, Bloch, and *T. lyra*, Linn., in neither of which, according to Cuv. & Val., has the air-vessel any lateral process; but in the third, *T. hirundo*, Bloch, we find a lateral process on either side extending backwards as is seen in *T. pæcilopectera*.

It is evident that in the "Little Gurnard" these processes augment in extent with the age of the fish; but I have not seen them reaching round the posterior extremity of the air-vessel, as I have found them doing in large examples of *T. hirundo*; I have, however, found them two thirds of the length of the air-vessel in examples<sup>1</sup> about 6 inches in length. I have not seen any very young specimens of *T. hirundo*; neither do I know of their having been recorded, unless in the form of *T. pæcilopectera*.

In the very young, these fishes appear to be unsocial, keeping near the bottom of the water and spreading out their pectoral fins so that they appear like beautiful blue butterflies with white and light-blue spots on either wing. As they increase in size the dimensions of the spotted portion of the fin decrease; and in some cases it seems to disappear. In *T. hirundo*, on the contrary, the inner side of the pectoral fin is blue, with transverse black bands in its whole extent. Curiously, one of the examples on the table, upwards of 9 inches in length, has one pectoral fin coloured as in *T. hirundo*, whereas the other shows unmistakable evidence of the remains of the immature spot. As a rule, fins with the large spot are only banded on their outer two thirds; while fins destitute of spots are banded in their whole extent.

P.S. Since the foregoing was written I have seen, in the collection of the British Museum, several examples of the young of *T. hirundo* having the vivid colours of *T. pæcilopectera*, seven being from Weymouth; while the following specimens still have traces, to a greater

<sup>1</sup> All these various sizes are present on the table.

or lesser extent, of the dark pectoral blotch covered with light spots:—one,  $12\frac{1}{2}$  inches long, from the Propontis; another,  $9\frac{1}{2}$  inches long, from Dalmatia; a third, of the same size, from Naples; and a fourth,  $7\frac{1}{2}$  inches in length, from Sicily.

As no structural difference is observable between *T. pæcilopectera* and *T. hirundo*, except such as may be due to age, I think we are justified in considering the former the immature of the latter; while the immature colours may be continued (although less decidedly) to the adult age, this difference being restricted to the inner side of the pectoral fin.

Whether Thompson's specimen was *T. hirundo* or *T. lineata* is open to grave doubt. He says:—"10 dorsal spines . . . lateral lines spinous;" and as to colours, "I have little doubt that when recent it would in colour have corresponded. So I conclude it did not correspond when he received it from Mr. Ball, who obtained the single example, 2 inches in length, from among some sprats captured at Youghal, in Ireland. A *Trigla* possessing ten dorsal spines and a spinous lateral line is unlikely to be *T. pæcilopectera*, which has nine dorsal spines and a smooth lateral line.

#### EXPLANATION OF PLATE XVIII.

*Trigla hirundo*, from a specimen in the author's collection obtained near Southend: a. Stomach and caecal appendages; b. Air-bladder; c. Pectoral fin (inner side).

#### 11. On a Collection of Mollusca from Japan. By EDGAR A. SMITH, F.Z.S., Zoological Department, British Museum.

[Received January 28, 1879.]

(Plates XIX., XX.)

A large collection of Japanese Mollusca, containing very many new and most interesting forms, has been presented to the British Museum by Dr. J. Gwyn Jeffreys, F.R.S., with his wonted liberality. It is a most valuable addition to the series of species from the same region which was placed in the national collection a few years ago by the same gentleman. That series, of which a brief account of the Gastropoda only appeared in the 'Annals and Magazine of Natural History' for 1875, was dredged by Capt. H. C. St. John, of H.M.S. 'Sylvia.' The specimens now to be considered were derived from the same source; and the highest praise must be accorded to Capt. St. John for the excellent manner in which they have been collected and preserved. Most of them are from the region of the Goto islands; and to save the continual repetition of the longitude, latitude, and depths of the various stations, a list of them with consecutive numbers is appended below; so that for the locality of each species only the number of the station will be quoted.

*List of the Stations.*

Station 1. Goto Islands in the Korean Channel,  $33^{\circ} 19' N.$  lat.,  $129^{\circ} 7' E.$  long.; 50 fathoms.

Station 2. East of Goto Islands,  $32^{\circ} 43' N.$  lat.,  $129^{\circ} 28' E.$  long.; 58 fathoms.

Station 3. West of Goto Islands,  $33^{\circ} 10' N.$  lat.,  $128^{\circ} 51' E.$  long.; 54 fathoms.

Station 4. Low-water mark, Goto Islands.

Station 5. Ojica Bay, Goto Islands,  $33^{\circ} 12\frac{1}{2}' N.$  lat.,  $129^{\circ} 5' E.$  long.; 10 fathoms.

Station 6. Ibid. On rocks at low water.

Station 7. Goto Islands,  $32^{\circ} 49' N.$  lat.,  $128^{\circ} 54' E.$  long.

Station 8. Ukushima, Goto Islands,  $33^{\circ} 15\frac{1}{2}' N.$  lat.,  $129^{\circ} 5' E.$  long.; 11 fathoms.

Station 8\*. Ibid.  $33^{\circ} 16' N.$  lat.,  $129^{\circ} 4' E.$  long. Among rocks at low water.

Station 9. East of Goto Islands,  $33^{\circ} 10' N.$  lat.,  $129^{\circ} 12' E.$  long.; 36 fathoms.

Station 10. East of Goto Islands,  $33^{\circ} 4' N.$  lat.,  $129^{\circ} 18' E.$  long.; 23 fathoms.

Station 11. West of Goto Islands,  $33^{\circ} 2\frac{1}{2}' N.$  lat.,  $128^{\circ} 48\frac{1}{2}' E.$  long.; 22 fathoms.

Station 12. North of Goto Islands,  $33^{\circ} 19' N.$  lat.,  $129^{\circ} 7\frac{1}{2}' E.$  long.; 50 fathoms.

Station 13. East of Goto Islands,  $32^{\circ} 47' N.$  lat.,  $129^{\circ} 5' E.$  long.; 46 fathoms.

Station 14. East of Goto Islands,  $32^{\circ} 48\frac{1}{2}' N.$  lat.,  $129^{\circ} 6' E.$  long.; 47 fathoms.

Station 15. East of Goto Islands,  $33^{\circ} 15' N.$  lat.,  $129^{\circ} 18' E.$  long.; 40 fathoms.

Station 16. West of Goto Islands,  $33^{\circ} 8' N.$  lat.,  $128^{\circ} 46' E.$  long.; 60 fathoms.

Station 17. West of Goto Islands,  $33^{\circ} 14' N.$  lat.,  $128^{\circ} 55' E.$  long.; 40 fathoms.

Station 18. East coast of Kii, south of Nippon.

Station 19. East of Kii,  $34^{\circ} 13' N.$  lat.,  $136^{\circ} 13' E.$  long.; 48 fathoms.

Station 20. East of Kii,  $34^{\circ} 11' N.$  lat.,  $136^{\circ} 25' E.$  long.; 56 fathoms.

Station 21. Between south-western extremity of Nippon and the island of Shikoku,  $33^{\circ} 45\frac{1}{2}' N.$  lat.,  $132^{\circ} 30' E.$  long.; 30 fathoms.

Station 22. Inland sea between Shikoku and Nippon,  $34^{\circ} 31' N.$  lat.,  $133^{\circ} 40' E.$  long.; 22 fathoms.

Station 23. Channel between the east end of Shikoku island and the Kii peninsula,  $33^{\circ} 52' N.$  lat.,  $135^{\circ} 4' E.$  long.; 30 fathoms.

Station 24. Gulf of Yedo,  $35^{\circ} 24' N.$  lat.,  $139^{\circ} 43' E.$  long.;  $10\frac{1}{2}$  fathoms.

Station 25. South of Nippon,  $34^{\circ} 12' N.$  lat.,  $136^{\circ} 28' E.$  long.; athoms.



Station 26. West of Nagasaki,  $32^{\circ} 43'$  N. lat.,  $129^{\circ} 28'$  E. long.; 40–58 fathoms.

Station 27. North of Kiushiu,  $33^{\circ} 56'$  N. lat.,  $130^{\circ} 27'$  E. long.; 30 fathoms.

Station 28. Satsuma Bay, south Kiushiu.

Station 29. South of Korea,  $34^{\circ} 8'$  N. lat.,  $126^{\circ} 24'$  E. long.; 24 fathoms.

Station 30. South of Korea,  $33^{\circ} 42'$  N. lat.,  $127^{\circ} 40'$  E. long.; 51 fathoms.

Station 31. South of Korea,  $34^{\circ} 30'$  N. lat.,  $125^{\circ} 44'$  E. long.; 20 fathoms.

Station 32. South of Korea,  $34^{\circ} 19'$  N. lat.,  $124^{\circ} 57'$  E. long.; 12 fathoms.

#### GASTROPODA.

##### 1. *TEREBRA EVOLUTA*, Deshayes.

*Terebra evoluta*, Deshayes, P. Z. S. 1859, p. 292; Reeve, Conch. Icon. xii. f. 55.

*Hab.* Station 8.

Like the specimens which were mentioned by me in the 'Annals and Magazine of Natural History' 1875, these also from the Goto Islands are much smaller than the type, which seems to be of very unusual dimensions. The Goto specimens differ from the type and the others from Matoza Harbour in having a much narrower sulcus at the upper part of the whorls, from which circumstance the infrasutural band is broader. The colouring and sculpture are the same.

##### 2. *TEREBRA GOTOENSIS*. (Plate XIX. figs. 1–1 a.)

Shells subulate, pale brown or fawn-colour, with a white band spotted with brown at the upper part of the whorls, and with a white narrow zone round the middle of the last whorl: volutions 16; the two apical ones white, smooth, subglobose, the rest almost flat, only very faintly constricted towards the upper part, where they are unequally divided by a transverse shallow groove, longitudinally ribbed and very finely striated, the striæ being inconspicuous to the naked eye and scarcely developed at all on the ribs; the latter are but little raised, arcuate, and divided at the upper part by the spiral furrow, and number about 24 on the penultimate whorl; costæ on the last volution obsolete at the periphery: columella white, oblique at the base, straightish at the upper part; canal short, recurved, oblique.

Length 25 millims., diameter 5.

*Variety.* Shell more slender, similarly sculptured; spots on infrasutural band dark brown; rest of surface purplish brown, variegated with white patches. Length 29 millims.; breadth  $4\frac{2}{3}$ . (Fig. 1 a.)

*Hab.* Station 1. Var., Japan.

The brown spots on the white zone at the top of the whorls are somewhat distant from one another, of a transversely oblong subquadrate form. Below these are other less conspicuous spots placed

under them, so that the upper series might be said to be subdivided by the spiral furrow which separates them. The general tone of the shell is light brown or fawn; but a few of the upper whorls are of a more or less lilac tint. The variety, from its slenderness and different coloration, appears at first sight almost specifically distinct; its sculpturing, however, is of precisely the same character as that of the typical form. The painting of *T. alveolata*, Hinds, resembles that of this species very much; but its sculpture is a great deal coarser.

### 3. *TEREBRA JEFFREYSII*. (Plate XIX. fig. 2.)

Shell subulate, dirty yellowish, dotted and streaked with light brown. Whorls 13 to 14; the two nuclear ones proportionally very large, globose, white, shining; the rest flat, bearing numerous oblique, but little raised fine costæ (about 20 on a whorl), and spirally striated, the striæ cutting through the riblets and giving them a nodulous appearance: the striæ number about five on a whorl; of these the two uppermost are twice as far apart as the three following, and consequently the spaces between them are wider and more conspicuous; the ends of the costæ cut off by the two uppermost striæ are prominently nodulous, and form two distinct series of granules, whereof the upper are more elongate than the lower. The body-whorl is but very faintly angled at the middle; the costæ upon it terminate abruptly at that part, and are only continued to the base in a very obsolete manner; thus the lower half of the whorl is comparatively smooth to the upper portion, and the spiral or concentric striæ are also less pronounced than those above. The aperture is small, light brown, and exhibits traces of one or two pale narrow zones. The canal is short, oblique, and slightly recurved: the columella is straight or nearly so in the middle and oblique at the base, and covered with a thin, shining, whitish callosity.

Length 25 millim., diam. 5.

*Hab.* Stations 20 and 21.

This species is remarkable on account of the unusually large size of the nuclear whorls. The colour is rather indistinct, as most of the specimens are more or less coated with a cretaceous deposit; however, it appears to be luteous or dirty yellow, dotted with light brown between the two series of nodules, and streaked with the same colour beneath, and the body-whorl has a pale zone at the middle.

### 4. *TEREBRA TORQUATA*, Adams & Reeve.

*Terebra torquata*, Adams & Reeves, Voy. Samarang, p. 30, pl. 10. fig. 13; Reeve, Conch. Icon. vol. xii. fig. 69.

*Hab.* Station 14. China Sea (*A. Adams*).

This species must not be confounded with *T. fenestrata*, Hinds. The latter is very similarly sculptured, but lacks the variegated painting of *T. torquata*.

### 5. *TEREBRA TEXTILIS*, Hinds.

*Terebra textilis*, Hinds, P. Z. S. 1843, p. 156; id. Voy. Sulphur,

p. 34; id. Sowerby's Thesaur. Con. vol. i. pl. 44. fig. 73; Reeve, Conch. Icon. vol. xii. fig. 130.

*Hab.* Station 18. Philippines (*Cuming*); Straits of Macassar (*Hinds*); Ovalau, Fiji Islands (*Macgillivray in Brit. Mus.*).

#### 6. *TEREBRA SUBTEXTILIS*. (Plate XIX. fig. 3.)

Shell subulate, entirely white: whorls probably about 22, the few apical ones being broken off; they are a little convex, finely ribbed, and spirally grooved; costæ about 20 on a whorl, arcuate, constricted a little below their upper extremities by a spiral furrow, which in the interstices between the ribs is comparatively deeply pitted; transverse striæ rather deep, more or less obsolete on the costæ, about ten in number on a whorl, whereof three are above the pitted sulcus, and the rest below it; the ribs on the last whorl are arcuate above and flexuous at the base, to which they attain; the lower part of the whorl is also transversely sulcated like the upper portion; columella covered with a distinct callosity; canal short, rather broad and recurved.

Length 37 millims., diam. 6.

*Hab.* Station 21.

This species to a certain extent has the characters of *T. textilis*, *Hinds*. From it, however, it may be known by its more convex and broader whorls, its greater size, and the more numerous spiral sulci or striæ, which in this species are present on the infrasutural band as well as below the pitted groove, whilst in *T. textilis* they only exist on the latter portion of the whorls, leaving the upper part plain, with the exception of the cut-off terminations of the costæ. These striæ are of different magnitudes, so that the interstices also vary in size and also in their degree of elevation. The sculpture of *T. polygyrata*, *Desh.*, is similar in character, but much finer. That, too, is a coloured species and smaller.

#### 7. *TEREBRA TANTILLA*, Smith. (Plate XIX. fig. 4.)

*Myurella tantilla*, Smith, Ann. & Mag. Nat. Hist. 1873, vol. xi. p. 270.

*Myurella pumilio*, Smith, *l. c.* p. 269.

*Hab.* Station 21. Persian Gulf (*Col. Pelly in Brit. Mus.*).

The specimens described under the name of *T. tantilla* were in bad, faded condition; and hence it was that the third band on the body-whorl escaped observation. I am now convinced of the identity of *P. tantilla* and *T. pumilio*.

#### 8. *TEREBRA ALBOZONATA*, Smith. (Plate XIX. fig. 5.)

*Terebra albozonata*, Smith, Ann. & Mag. Nat. Hist. 1875, vol. xv. p. 415; *l. c.* 1877, vol. xix. p. 226.

*Hab.* Station 27. Matoza Harbour (*l. c.*).

It is satisfactory to have obtained a second, although young, example of this species agreeing perfectly with the type.

I take this opportunity of changing the name of a species of

*Terebra* described by me as *granulosa* in the Ann. & Mag. Nat. Hist. 1873, vol. xi. p. 268: I propose to call this interesting Japanese form *T. pustulosa*.

9. *PLEUROTOMA FUSCA*, var., Hombron & Jacquinot.

*Pleurotoma fusca*, var., Hombron & Jacquinot, Voyage au Pôle Sud, Zoologie, vol. v. p. 111, pl. 25. figs. 19, 20.

Shell fusiform, pale horn-colour, with a white band round the middle of the whorls, brownish at their upper part: whorls 10; first three convex, the rest strongly keeled above at the suture; beneath this keel they are concavely sloping, prominently carinated at the middle, the carina being white and bearing small close-set nodules; beneath and above this series of nodules the whorls are ornamented with three or four spiral thread-like liræ and oblique lines of growth; last whorl whitish at the lower extremity, with a brownish somewhat indistinctly defined band around the middle, and encircled with about 15 liræ below the white carina; mouth and canal occupying rather less than half the entire length of the shell; slit in the labrum small, situated at the termination of the prominent white keel; canal narrow, produced, and a little recurved.

Length 17 millims., diam. 5.

*Hab.* Stations 1 and 21. "Torres Straits" (*Hombron & Jacquinot*).

Although in some respects like the Californian *P. gemmata*, Hinds, nevertheless, on comparison with that species, the present one appears sufficiently distinct for specific rank. It has a less slender spire and is strongly carinated beneath the suture, whilst *P. gemmata* is described by Hinds as having two small keels parallel with the suture; and Reeve ('Conchologia Iconica,' i. sp. 83) refers to these keels as "two very distinct elevated lines." A second, rather deep sinus is situated in the outer lip, about halfway between the suture and the caudal extremity. This character is not referred to by Hombron & Jacquinot; but if the labrum of their single specimen were broken (and this is very possible, judging from the figure of it), of course the slit would not be present. The name *fusca* has been employed earlier for a species in this family by C. B. Adams; but as that belongs to a different section, I think it inadvisable to alter the name of the present.

10. *PLEUROTOMA MARMORATA*, Lamarek.

*Pleurotoma marmorata*, Kiener, Coq. Viv. pl. 6. fig. 11; Reeve, Conch. Icon. vol. i. fig. 21; jun. = *Pl. hastula*, Reeve, l. c. fig. 139.

*Hab.* Station 21.

Other localities are:—the Straits of Malacca; Shanghai; Ticao, Philippines; and Ovalau, Fiji Islands.

11. *PLEUROTOMA VERTEBRATA*, Smith. (Plate XIX. figs. 6-6 a.)

*Hab.* Stations 21 and 27.

The description of this species in the 'Annals and Magazine of Natural History,' 1875, vol. xv. p. 416, was based upon specimens

from the Persian Gulf (fig. 6). The Japanese examples (fig. 6<sup>a</sup>) differ in a slight measure: they are a trifle narrower, have a very slightly more elongated canal; and the apex is brown instead of pale violet as in the typical form. In sculpture and colouring they are identical.

## 12. *PLEUROTOMA NIPONICA*. (Plate XIX. fig. 7.)

Shell shortly fusiform, light brown: whorls  $6\frac{1}{2}$ ; nucleus consisting of  $1\frac{1}{2}$ , rather large, globose, glassy shining; the four whorls following strongly keeled around the middle, concave above, with two or three fine spiral liræ, and also concave below the carina, margined at the upper and lower boundaries by a fine thread-like lira, arcuately or flexuously elevately striated above the carina, and obliquely, but in an opposite direction, beneath it; the last whorl encircled beneath the principal keel by about ten liræ, whereof the uppermost is the stoutest, the rest gradually becoming finer towards the base; the interstices between them crossed by elevated striæ or lines of increment. Aperture small, brownish, occupying about three sevenths of the entire length of the shell; slit situated in the concavity above the principal carination; columella a little convex or prominent in the middle, and oblique below it; canal short, scarcely recurved.

Length 7 millims., width  $2\frac{1}{2}$ .

*Hab.* Station 21.

This pretty shell is recognizable by the strong central keel to the whorls, which are excavated above and below, and the raised striæ on the upper portion are obliquely flexuous towards the right, whilst those below the carina are obliquely straight and inclined to the left.

## 13. *PLEUROTOMA DIFFICILIS*. (Plate XIX. fig. 8.)

Shell shortly fusiform, brownish horn-colour. Whorls nearly flat, strongly keeled a little below the middle, and above at the suture, with one or two thread-like spiral liræ in the spaces between these two carinæ and between the subcentral one and the suture below it; lines of growth moderately distinct, raised, flexuous, and more or less oblique; nucleus (or the three apical whorls) smooth, glassy, shining, convex; the fourth also convex and coarsely obliquely costate; last whorl encircled by about ten coarsish liræ, whereof the three uppermost are equal in size to the submedian carina of the upper whorls, which falls just above them on this volution; the interstices between them coarsely striated by the lines of growth. Aperture small, occupying three sevenths of the entire length; columella brown, coated with a smooth enamel, oblique below the middle; slit above the submedian liration; canal short, very little recurved. Operculum ovate, pointed at the base; nucleus apical.

Length 7 millims., width  $2\frac{1}{2}$ .

*Hab.* Stations 21 and 27.

Of this species there are two specimens in the collection. In both there are two fine thread-like liræ in the interstice between the upper and submedian keels on the last two whorls; but the upper one gradually becomes obsolete on ascending the spire. The upper of the

two fine liræ in the inframedian space also gradually disappears or attenuates on the upper whorls.

14. *PLEUROTOMA TRIPORCATA*. (Plate XIX. fig. 9.)

Shell shortly fusiform, of a uniform pale brown or luteous tint. Whorls 9, the first globular, glassy, rather large, the rest encircled with three distinct keels: the uppermost is just beneath the suture; the median one (the most prominent of all) is situate in the middle of the whorls, and the lowermost a little above the lower suture: the interstices between the carinations are finely latticed with spiral thread-like liræ and raised incremental lines; the former are about three or four in number in each of the interstitial spaces, and the latter very arcuate between the central and uppermost keel, and very oblique beneath the former: the body-whorl has about twelve additional carinæ or liræ, whereof the four uppermost are stouter and further apart than those beneath. Columella a little oblique and arcuate above the middle, more sloping below; labrum thin, very much produced in the middle, widely and deeply notched between the terminations of the uppermost and principal keels; canal short, recurved.

Length 14 millims., diam.  $4\frac{1}{2}$ .

*Hab.* Station 1.

This is another species belonging to the same section of the genus *Pleurotoma* as the three preceding. They are all sculptured with the same character of ornamentation; yet in detail it is very distinct, and they also show good differences in the nuclear whorls.

15. *PLEUROTOMA PATRUELIS*, Smith. (Plate XIX. fig. 10.)

*Pleurotoma* (—?) *patruelis*, Smith, Ann. & Mag. Nat. Hist. 1875, vol. xv. p. 419.

*Hab.* Gulf of Yedo,  $10\frac{1}{2}$  fathoms.

The specimen from the above locality agrees precisely with the type in colour and sculpture, but it is rather more robust. It is  $25\frac{1}{2}$  millims. long, and 8 broad. When describing this species I was unable to give any account of the labrum, as, unfortunately, it was broken away in the only specimen at hand. In the perfect shell it is thin, prominent in the middle, and broadly sinuated at the upper part in the concavity of the whorl. Columella a little oblique, covered with a callosity, thickest towards the base. Operculum sub-ovate, concentric, nucleus subcentral, but rather towards the inner or columellar side (fig. 10 a).

16. *PLEUROTOMA CONSIMILIS*. (Plate XIX. fig. 11.)

Shell ovately fusiform, turreted, pale fleshy brown. Whorls 8; the first globular, glassy, smooth, the rest concave above, angled at the middle and a little concave below the angle, longitudinally flexuously obsoletely plicated; plicæ obsoletely nodulous above at the suture, bearing larger nodules at the angle and two smaller ones beneath it; nodules connected by spiral liræ between the plicæ, which are coarser than other intermediate fine spiral lirations; the last whorl encircled

by about fourteen of these transverse liræ, whereof nearly all, with the exception of a few at the base, are more or less granular on the plicæ. Aperture equalling about two fifths of the entire length of the shell, light brown; fissure in the lip, below the suture, and above the nodulous angle, broad and moderately deep; labrum thin, prominent in the middle, with a very shallow sinuation near the base, smooth and not lirate within; columella callous at the base; canal very short. Operculum elongate, rather acuminate at both ends; nucleus terminal.

Length  $18\frac{1}{2}$  millims., diam.  $6\frac{1}{2}$ .

*Hab.* Station 29. Also China Seas (*Mus. Cuming*).

The style of sculpture of this species is considerably like that of *P. metcalfei*, Angas. However, the whorls are fewer, the nuclear one being larger, the last proportionally broader. The few lirations within the lip of that species are wanting in the present one; and the tubercles around the middle of the whorls are less oblong than in *P. metcalfei*.

#### 17. DRILLIA PERADMIRABILIS. (Plate XIX. fig. 12.)

Shell robustly fusiform, whitish or yellowish white, stained with brown beneath the suture, and obscurely banded with the same colour about the middle of the last whorl, spotted and dotted with a lighter tint irregularly over the rest of the surface, but leaving a plain white zone at the angulation of the whorls and a second just above the median brown one on the last whorl; apex white. Volutions  $8\frac{1}{2}$ ; one and a half nuclear smooth, globose; the rest concavely sloping above, then obtusely angled about the middle, rounded, and much contracted beneath, obliquely plicated and spirally lirated; plicæ rounded, oblique, but little elevated, more or less obsolete at the upper part. Transverse liræ most beautifully and finely granulated, separated by deep-cut striæ of different sizes, those in the concavity of the whorls subequal and finer than those beneath, which, again, are not all of uniform tenuity; on the penultimate whorl they number about 20, and on the last as many as 55; those around the lower part of the last whorl are pretty regularly alternately larger and small, the latter being the more granulous. The body-whorl is contracted at the lower part, and is destitute of the plicæ on about a third of its extent near the lip. Aperture together with the canal a little less than half the length of the shell, brownish within, with a single white central zone, and a white patch parallel with the margins of the lip, corresponding to a stout exterior submarginal varix, and stained with dark brown between this and the thin prettily crenulated edge of the labrum, which is curved and very shallowly sinuated towards the base, and finely sulcated within, but at the edges; sinus deep, at the suture; columella a little oblique and tortuous, whitish, without markings or callosity, only furnished with a small whitish tripartite tubercle at the upper part, just a little below the sinus, and connected with the suture by a thin callus.

Length 23 millims., diam.  $7\frac{1}{2}$ .

*Hab.* Stations 1 and 32.

The example of this most wonderfully sculptured species from the latter locality is a little darker in colour than the other. The marking on the upper part of the whorls and the bands on last volution are of a dull purplish brown.

18. *DRILLIA NAGASAKIENSIS*. (Plate XIX. fig. 13.)

Shell elongate, turreted, luteous. Whorls 9; two apical brown, smooth, convex; the rest keeled above at the suture, somewhat excavated beneath the carina, then convex at the sides, which contract inwards towards the base; they are closely ribbed and transversely grooved; the costæ are rounded, oblique, sixteen on the penultimate volution, and do not quite attain to the suture, but become obsolete in the sloping concavity above; the spiral ridges between the sulci number eight on the penultimate whorl; of these the three uppermost are very fine and situated in the concavity above, the rest are much coarser and subnodulous on the costæ; the latter are attenuated inferiorly on the last volution, and become obsolete a little below the middle; one of them near the tip is considerably enlarged in the form of a varix; the spiral sulcation also extends over the entire surface. Aperture rather small, occupying a third of the entire length, light brown within; labrum thin, much produced and arcuated at the middle, broadly and deeply notched a little below the suture, and with a second shallow sinuation near the base; columella suberect, smooth, coated with a thin callosity, terminating above at the sinus in the form of a tubercle; canal short, broad, but little recurved.

Length 17 millims., diam. 5.

*Hab.* Station 26.

This species has much the appearance of *P. pyramidula* of Reeve (Con. Icon. fig. 260). The whorls, however, are more convex at the sides and broader, and the lip is different. The costæ are less numerous on the upper whorls than on the lower one, and they gradually become finer as the shell increases, so that those on the last volution are more slender than those on the upper part of the spire.

19. *DRILLIA LONGISPIRA*. (Plate XIX. fig. 14.)

Shell slender, fusiform, whitish, banded with brown between the costæ; zones two in number on the upper whorl—one a little below the upper suture, and the other at the base. Whorls 10, the two first smooth, convex, the rest somewhat excavated above, obtusely angled at the middle, obliquely costate and spirally striated; ribs about six on a whorl, oblique, subnodose at the middle, attenuating at both extremities and not reaching to the upper suture; transverse striæ rather coarse, minutely decussated by the flexuous lines of growth; last whorl with a third brown zone below the middle. Aperture whitish within, ornamented with the three exterior bands, occupying about four elevenths of the entire length of the shell; sinus deep, situated in the upper part of the lip, which is thin, has a second shallow sinuation near the base, and is much produced and



arcuate in outline in the middle; columella straightish, but a trifle oblique, covered with a thin callosity terminating in a tubercle at its junction with the upper extremity of the labrum; canal short, recurved.

Length  $16\frac{1}{2}$  millims., diam.  $4\frac{1}{2}$ .

*Hab.* Station 13.

This slender species is well characterized by the brown bands, which are interrupted by the oblique ribs. The spiral striation is rather coarse.

20. *DRILLA JAPONICA*, Lischke. (Plate XIX. fig. 15.)

*Drilla japonica*, Lischke, Japanische Meeres-Conch. i. p. 32.

*Hab.* Station 27. Nagasaki (*Lischke*).

The number of whorls is rather underestimated by Lischke, whose two specimens were mutilated at the apex, and had but six remaining volutions. The two examples in the present collection have eleven each, whereof the two nuclear ones are brown, smooth, and shining; the rest are a little constricted at the upper part, and then rather convex. Both of these shells and also a third in the Cumington Collection display two or three transverse series of more or less distinct whitish granules; a little below the middle of the last whorl they form an ill-defined band terminating in the white spot near the base of the labrum, which at this point has a second shallow sinus.

21. *DRILLIA OBLIQUATA*, Reeve, var.

*Pleurotoma obliquata*, Reeve. Conch. Icon. i. fig. 262.

*Hab.* Station 21. —? (*Reeve*); Ceylon and Singapore (*Mus. Cuming*); var. from Persian Gulf (*Colonel Pelly*).

The single shell of this species is not full-grown, and differs from the normal form in having a series of white dots on the ribs, in place of the band round the middle of the whorls. In describing this species, Reeve omitted to notice the presence of a transverse row of minute white dots situated on the costæ a little below the middle of the body-whorl, the end or cauda of which is encircled by about five oblique liræ; columella smooth, very slightly oblique, covered with a callosity terminating in a large tubercle at the upper end of the labrum, and aiding in forming the large rounded sinus; labrum thin at the edge, with a large swollen varix some distance behind, and with a second slight emargination near the base.

22. *DRILLIA SUBORLIQUATA*. (Plate XIX. fig. 16.)

Shell acuminate ovate, light brown, with a narrow white zone a little below the middle of the whorls, and a second, less distinct and subinterrupted one a little below the middle of the body-whorl: whorls 9, two nuclear smooth, convex, white, the rest concave at top, thin, convex at the sides, obliquely costated and finely transversely lirated; costæ rather fine, 14 on the penultimate whorl, subnodose a little above the middle, where the concavity of the whorl commences, attenuated at the upper extremity, and becoming obsolete about the middle of the body-whorl; the spiral liræ are not conspicuous, rather

far apart, and are not found in the excavation at the upper part of the volutions: aperture small, occupying rather more than a third of the entire length; sinus deep, inferior sinuation very shallow; canal very wide, not recurved; columella covered with a pale brownish callosity, tuberculated at the upper extremity.

Length 18 millims., diam. 6.

*Hab.* Station 15.

This species is closely affined to *P. obliquata*, Reeve. It differs in being more slender, has a narrower concave portion at the top of the whorls, and consequently longer rounded sides; the costæ are more numerous and less produced inferiorly on the last volution; and the surface, with the exception of the upper or depressed part of the whorls, is ornamented with fine subdistant lirulæ, which in *obliquata* are altogether wanting; the basal canal, too, is broader, and the labrum has not the large swollen varix behind it which is characteristic of Reeve's species.

### 23. DRILLIA CANDENS. (Plate XIX. fig. 17.)

Shell shortly subfusiform, entirely white, shining, subpellucid: whorls 8, two nuclear ones large, globose, smooth, the rest rather bulging towards the lower part, and a little constricted above, obliquely ribbed and striated by the lines of growth; costæ stouter on the upper whorls than on the last, on which they are obsolete at the middle; they are very oblique and flexuous; the lower part of the body-whorl is sculptured with fine oblique grooves, which by degrees are less distinct on the upper portion; sinus very wide and deep, inferior sinus slight; columella but little oblique, sinuous, covered with a white shining enamel, with a small tubercle at the upper extremity; canal broad, very short, and not recurved.

Length 12 millims., diam.  $4\frac{1}{2}$ .

*Hab.* Stations 1 and 15.

This is a very pretty species, of a diaphanous white tint, a little more opaque just beneath the suture. Besides the fine lines of growth, other striæ in a transverse direction, and equally fine, can be discovered in parts under a powerful lens. For such a small shell the sinus is remarkably large and deep; the apical whorls, too, are proportionally large.

### 24. DRILLIA RARICOSTATA. (Plate XIX. fig. 18.)

Shell elongate, shining, horny brown: whorls 8, two apical transversely keeled and angled round the middle; the rest concavely excavated above, convex below, coarsely obliquely plicated, and somewhat margined beneath the suture; plicæ abruptly terminating at the concavity, eight on a whorl, very oblique, gradually shorter on ascending the spire, so that the upper rather acute ends fall about the middle of the whorls; costæ on last whorl obsolete at the base, which is obliquely grooved: aperture very small, about one third as long as the whole shell; sinus deep, inferior sinuation shallow; labrum thin, curved and prominent, with a swollen varix some distance behind the margin; columella scarcely oblique, but slightly sinuous,

covered with a callosity, tuberculated above at the suture; canal very short and a little recurved.

Length 10 millims., diam.  $3\frac{1}{3}$ .

*Hab.* Station 26.

This species is remarkable for the abrupt and acute termination of costæ above.

25. *DRILLIA INTERMACULATA*. (Plate XIX. fig. 19.)

Shell shortly fusiform, shining, subpellucid, white, with two transverse series of brownish-yellow dots between the ribs on the upper whorls and four on the last. Whorls 7, two nuclear ones simple, smooth, convex, the others concave at the upper part and convexish beneath, ornamented with oblique rounded costæ, which become obsolete above, not attaining to the suture, twelve in number on a whorl; those on the body-whorl less strongly developed, especially near the labrum, and not extending downwards below the middle. Aperture occupying about two fifths of the entire length; sinus deep, lower sinuation slight; columella arcuate, with a tubercle at the suture; canal very short, wide, and not recurved.

Length  $10\frac{1}{3}$  millims., diam.  $3\frac{1}{2}$ .

*Hab.* Station 31.

The painting of this pretty shell is very characteristic; the uppermost series of dots is situated between the ribs just about where they become obsolete, the second row at the middle of the body-whorl, and the two following at equal distances below.

26. *DRILLIA HUMILIS*. (Plate XIX. fig. 20.)

Shell fusiformly ovate, chocolate-brown at the base of the whorls and lighter above, indistinctly banded with white round their middle, the band being most conspicuous on the ribs, which are also white at their upper extremities. Whorls 8; two apical smooth, convex, rather large, the rest considerably excavated above and rather bulgingly convex inferiorly and obliquely ribbed; costæ nine in number on the penultimate whorl, subobsolete in the concavity at the upper part of the whorl, and again nodulous at the suture; last whorl with a transverse series of white dots on the costæ a little below the middle; ribs gradually attenuating downwards, not extending quite to the extreme base; the latter, or cauda, is sculptured with about six oblique fine grooves. Aperture small, brown, white at the sinus and at the termination of the series of dots a little below the middle; sinus large, deep, rounded, in the concavity, lower sinuation slight; lip thin, arcuate, produced, with a large tumid varix at a little distance from the margin; columella a trifle oblique, coated with a smooth brown callus, adjoining the suture in the form of a tubercle; canal very short, broad, and not recurved.

Length 9 millims., diam.  $3\frac{1}{4}$ .

*Hab.* Station 5.

This species at a first glance has the appearance of a dwarfed *D. obliquata* (Reeve), but when closely examined proves specifically distinct. It has fewer volutions, whereof the apical ones are propor-

tionally much larger; the form is less robust, and the colouring is different in detail.

## 27. DRILLIA FLAVONODULOSA. (Plate XIX. fig. 21.)

Shell solid, ovately fusiform, pale fleshy white, banded with yellow on a series of nodules around the lower half of the whorls, stained with reddish brown between the nodules, with a second series of yellow gemmules, with a reddish-brown lira beneath it, situated a little below the middle of the body-whorl. Whorls  $7\frac{1}{2}$ , apical ones large, the rest undulately carinated above at the suture, then concave, coarsely ribbed and spirally lirate; two of the liræ (in all six in number) are vastly stouter than the rest, and on crossing the ribs form two distinct series of nodules around the lower part of the whorls; the other liræ above and below these are fine and thread-like; beneath the sutural wavy keel on the last whorl are three fine liræ; then follow nine of the coarse nodulous ones; and around the basal extremity or cauda, which is brownish, are about six finer ones. Aperture small, a little more than one third the entire length of the specimen; labrum not thickened, rather deeply sinuated in the concavity at the upper part of the whorl; columella smooth, a trifle oblique, very slightly tortuous, covered with a moderately thick livid enamel; canal very short.

Length  $9\frac{1}{2}$  millims., width 3.

*Hab.* Station 22.

This is a solid species, peculiarly coloured, and readily known by the coarse granules. It belongs to the same group as *P. inconstans*, another Japanese form described by me in the Ann. & Mag. Nat. Hist. in 1875.

## 28. DRILLIA FORTILIRATA. (Plate XIX. fig. 22.)

Shell elongated, horny or dirty white, stained with brown or purplish brown at the extremity of the last whorl. Whorls 12, a little convex, rather coarsely clathrated by longitudinal costæ and transverse ridges; costæ a little oblique, rounded, ten or eleven on a whorl; spiral liræ very prominent, compressedly subnodulous on crossing the ribs, undulating or festooned, five or six in number, whereof the uppermost (which borders the suture) is especially developed; last whorl concave below the middle, at which point the ribs terminate, and encircled by about nine fine thread-like liræ. Aperture small, brownish within, equalling about two sevenths of the entire length of the shell; labrum thickened by the last costa, lirate internally, with a small sinus *a little below the suture*; columella coated with a thin brown callosity, obliquely sinuous, smooth, without liræ or granules; canal short, oblique, faintly recurved, broadish.

Length 14 millims., width  $3\frac{1}{2}$ .

*Hab.* Stations 21 and 14.

The liræ within the lip may not be a character of much specific value, as they are only observable in one of the four specimens before me.

## 29. DRILLIA SUBAURIFORMIS. (Plate XIX. fig. 23.)

Shell elongate, narrow, yellowish white, banded at the suture with purplish brown, and the lower half of the body-whorl of the same colour. Whorls 10; the two or three apical ones smooth, convex; the rest convex, sometimes exhibiting a slight angulation at a little distance from the top, obliquely costate and spirally lirate; costæ about fourteen on a whorl, rounded, varying somewhat in thickness in different specimens; liræ also subject to variation in number and stoutness, usually five or six in number, but sometimes as many as eight; on crossing the costæ they are a little thickened, producing a somewhat granulous effect; on the last whorl there are from eighteen to twenty liræ, whereof those around the base are smooth and simple, as they do not cross the riblets, which terminate a little below the middle of the whorl. Aperture varying in length in proportion to that of the entire shell, sometimes occupying a little more and in other specimens a trifle less than one third of it; labrum stained with brown, thickened exteriorly, denticulated or lirate within, and widely sinuated just below the suture; columella transversely lirate (this character is only apparent in quite adult shells, and then not obviously); canal short, narrow.

Length  $9\frac{1}{2}$  millims., diam.  $2\frac{2}{3}$ . Larger specimens are  $12\frac{1}{2}$  long and  $3\frac{1}{2}$  broad.

*Hab.* Station 21.

This species has for its nearest ally *Defrancia tecta*, Dunker. It is, however, more elongate, and apparently, judging from Dunker's description and figure, differently coloured. The small and larger forms of this species agree in all respects with the exception of size.

## 30. DRILLIA TEXTA, Dunker.

*Defrancia texta*, Dunker, Malakozool. Blät. 1859, vol. vi. p. 225; Moll. Japonica, p. 2, pl. i. fig. 19.

*Hab.* Station 22.

Little can be added to the excellent diagnosis of this species given by Dunker. The number of whorls in the specimen which I consider belongs to this species, from the above locality, is eight. The two nuclear are glassy, smooth, and convex; the rest are convex, with a slight tendency to angulation or shouldering at the upper part. Besides the colouring noticed by Dunker, the whorls are stained beneath the suture with light brown, in which respect it agrees with the preceding species (*subauriformis*), and in fact might almost be considered an extreme variety of it.

## 31. DRILLIA GRACILENTA, var., Reeve. (Plate XIX. fig. 24.)

*Pleurotoma gracilentia*, Reeve, Conch. Icon. sp. 114.

Var. = *P. contracta*, Reeve, l. c. sp. 116.

Var. = *P. fusoides*, Reeve, l. c. fig. 349.

Shell narrow, subfusiform, elongate, whitish, banded at the suture and around the middle and base of the last whorl with orange-red. Whorls 7, the first two smooth, very convex, shining; the rest

longitudinally and a trifle obliquely costate and transversely lirate, sloping at the upper part and a little convex below; the costæ on the upper whorls are coarser and fewer than on the body-whorl, which has about twenty, attenuated below, and not quite attaining to the base: the spiral liræ are four in number on the upper whorl, two principal ones with a smaller one between them around the middle, and the fourth below at the suture; on the body-whorl they number about sixteen. The entire surface under the microscope is seen to be minutely cancellated by the lines of growth and excessively slender spiral striæ. Aperture narrow, almost half the length of the shell, white within; lip thin at the edge, thickened both interiorly and without, and blotched with orange-red on both sides, the spots being the terminations of the transverse bands, without teeth or liræ; columella smooth, almost rectilinear, but inclining a little obliquely; sinus well defined, semicircular, situated in the labrum close to the suture.

Length 8 millims., width  $2\frac{1}{3}$ .

*Hab.* Station 18. Philippine Islands (*Cuming*).

The specimen above described resembles almost exactly the variety *contracta*, the figure of which in the 'Conchologia Iconica' is not at all good, the whorls being much too angular and the spiral line scarcely traceable.

### 32. *DEFRANCIA GRACILISPIRA*. (Plate XIX. fig. 25.).

Shell slender, fusiform, dirty yellowish, faintly banded with livid brown between the costæ near the top of the whorls, and stained with the same colour from the middle of the last whorl downwards. Whorls 12; three nuclear convex, minutely reticulated with raised obliquely crossing lines; the rest very convex, with a slight concavity, sculptured with distinct arcuate short raised lines beneath the suture, also bearing slender oblique costellæ (13 on the penultimate whorl), which are crossed by transverse liræ; these are four to six on the upper whorl, nodulous on the riblets; nodules compressed, subacute; last whorl convex above, slender below the middle; at this point the costellæ are becoming obsolete; and thence downwards the whorl is transversely obliquely lirate; the liræ are simple, subequal, and rather close together. Aperture narrow, occupying about four elevenths of the entire length; labrum imperfect, probably incrassated as in the European *D. gracilis* of Montagu; sinus at the suture; columella obliquely tortuous; canal rather long, narrow, somewhat recurved.

*Hab.* Station 27.

The slender form, the delicate riblets, the shallow excavation at the upper part of the volutions, and their convexity are the principal distinctive characters of this interesting shell. It belongs to the genus *Defrancia* as restricted by Jeffreys for species with the sinus in the suture and with the apical whorls minutely reticulated.

### 33. *DAPHNELLA?* *FUSCOBALTEATA*. (Plate XIX. fig. 26.)

Shell ovately fusiform, yellowish, pale violet or lilac towards the

apex, banded with light brown, one band at the top of the whorls darker than the rest. Whorls 9? (apex broken), obliquely sloping at the upper part, and slightly convex at the sides, strengthened with longitudinal suberect rounded costæ, whereof there are 12 on the penultimate whorl and about 16 on the last (those towards the labrum being finer), gradually vanishing a little below the middle; between the more slender ribs there are a few fine intermediate ones, but this may only be an individual peculiarity; the whorls are also transversely liræ; liræ of different thicknesses, numerous, raised equally between and upon the costæ, fewer and coarser upon the upper whorls, and about 30 on the body-whorl. Aperture rather narrow, less than half the length of the shell, exhibiting the same banded colours as the exterior; labrum thickened within and exteriorly, thin at the extreme edge, smooth interiorly; sinus small at the suture; columella simple, obliquely flexuous; canal a trifle oblique and slightly recurved.

Length 12 millims., width  $3\frac{1}{2}$ .

*Hab.* Station 21.

This species belongs to a section of *Pleurotoma* which includes *saturata*, Reeve, *subula*, Reeve, *albibalteata*, Reeve, and a few others.

#### 34. DAPHNELLA? SUBZONATA. (Plate XIX. fig. 27.)

Shell elongate, dull lightish brown, more or less distinctly banded at the middle of the whorls, with opaque white lines interrupted by dark brown dots or short lines; sometimes marked with opaque white streaks just beneath the suture, and with a second less apparent transverse band around the lower part of the last volution. Whorls 11; apical ones minutely reticulated; the rest convex, divided by an oblique suture, longitudinally costate, and transversely closely liræ; costæ rounded, a little oblique, 16 on the penultimate, and fewer on the preceding whorls; spiral liræ equally elevated on and between the ribs, about 12 on the penultimate, and, like the costæ, gradually fewer on the upper whorls; the entire surface microscopically reticulated. Aperture rather broad, somewhat of the same colour as the exterior, but a little clouded; lip arcuate, moderately thickened, with a small sinus at the suture, smooth within; columella suberect, a little oblique at the lower end, smooth; canal rather wide, short, but very little recurved.

Length 17 millims., width 5.

*Hab.* Station 27.

Allied to *Pleurotoma albibalteata*, Reeve, but narrower, with less-swollen whorls, of a different colour, and with the characters of the aperture and lip not agreeing.

#### 35. DAPHNELLA? SATURATA, Reeve.

*Pleurotoma saturata*, Rve. Con. Icon. vol. i. sp. 213.

*Hab.* Station 27. Corrigidor, Philippines (*Cuming*).

This specimen is a little lighter in colour than the type. The whorls in all examples are somewhat convex and have a narrow furrow just beneath the raised margin at the top; they are 9 in

number, the three apical ones being very much rounded and minutely reticulated by raised lines, oblique in opposite directions. This oblique reticulation is found in *Defrancia* as limited by Jeffreys (Brit. Conch. iv. p. 361), and also in *Daphnella* of Hinds.

36. *DAPHNELLA FRAGILIS*, Reeve, var.

*Pleurotoma fragilis*, Reeve, Con. Icon. sp. 179.

Var.=*P. lymnaeiformis*, Reeve, Con. Icon. sp. 325.

Non *P. lymnaeiformis*, Kiener, Coq. Viv. p. 62, pl. 22. fig. 3.

*Hab.* Philippine Is. (Reeve).

The Japanese specimen is much smaller than the type of this species, having a length of only 10 millims. However, in form and sculpture the differences are but very trifling. Its spire is certainly less acutely conical, and the reticulation of the surface proportionally coarser, in these respects approaching *Daphnella interrupta* of Pease (Proc. Zool. Soc. 1860, p. 147), a Sandwich-Island form. In truth the gradation from one species to the other is so subtle, that I fail at present to perceive any other differences except of size, stoutness of the spire, and the solidity of the labrum in *interrupta*.

37. *MANGILIA ROBUSTICOSTATA*. (Plate XIX. fig. 28.)

Shell ovately fusiform, light brown, whitish at the base of the body-whorl and labrum. Whorls 6; the apical one and half the succeeding forming the nucleus, globose, large, smooth; the rest turreted, angulated at the upper part at a short distance from the suture, beneath the angulation, which is rounded, sloping inward, so that they are much narrower at the lower part than at the angle, obliquely costate, and striated by the incremental lines; costæ very thick (12 on the penultimate whorl), subacute at their edge, and almost adjacent to one another at their bases, thinner and at times sublamellar at the upper extremities, and very obliquely flexuous from the angle downwards; on the last volution they gradually become obsolete below the middle. Aperture small, livid brown within, except near the lip, where it is whitish; labrum thin at the extreme edge, strengthened exteriorly by the last well-developed costa, which is white with a single livid-brown spot a little below the middle; sinus scarcely discernible; columella smooth, slightly oblique, subrectilinear, covered with a thin callosity which unites at the upper extremity with the termination of the labrum; canal very short.

Length  $6\frac{1}{3}$  millims., width  $2\frac{1}{2}$ .

*Hab.* Japan.

This species, like the British *M. septangularis*, exhibits but a very small sinuation in the labrum.

38. *LACHESIS JAPONICA*, A. Adams. (Plate XX. fig. 29.)

*Lachesis japonica*, A. Ad. Ann. & Mag. Nat. Hist. 1860, vol. v. p. 411.

*Hab.* Station 2. "Off Mino-Sima, 63 fms." (A. Ad.).

The largest specimen of this species in the Museum is 12 millims.



long and 4 broad. Adams describes the colour as fuscous. The only fresh specimen that I have seen is of a dirty transparent white tint, blotched with light brown at intervals beneath the suture, and indistinctly banded with the same colour a little below the middle of the last whorl, leaving a light zone above it which is visible within the aperture. The cancellation of the surface is composed of about 20 longitudinal arcuate costæ on the penultimate, crossed by six transverse liræ, rather finer than the costæ, on crossing which they are very prettily nodulous; this cancellation extends over the greater portion of the body-whorl; and the ribs not being produced quite to the extremity, the cauda is only transversely grooved or lirate. The lip is somewhat thickened exteriorly, thin and crenulate at the margin, arcuate and very faintly sinuated near the suture, and furnished within with about 10 short fine liræ at a little distance from the extreme edge. Columella whitish, only slightly flexuous, and a trifle oblique, covered with a thin smooth callosity which abruptly limits the clathrated surface of the whorl. Adams remarks that "the spire is as long again as the aperture." This is apparently a slight exaggeration, since in the most elongated specimen in the collection it only occupies  $\frac{7}{12}$  of the entire length.

39. MUREX SOBRINUS, A. Adams. (Plate XX. fig. 30.

*Murex sobrinus*, P. Z. S. 1862, p. 370.

Shell subclavately fusiform, whitish, with two reddish-brown bands interrupted by whitish costæ; one, the broader of them, rather below the middle of the upper whorls, and the other beneath the convexity of the last. Whorls 7; the two apical smooth, rounded; the rest convex, subangled above, trivariicose, tricostate between the varices and spirally lirated; liræ about eight on a whorl, those on the upper part finer than the inferior ones, which are compressedly nodulous on crossing the costæ and varices; the latter bear a single, shortish, upward-directed spine at the subangulation of the volutions; the upper whorls seem to be pretty constantly destitute of spines; the last whorl has a second shorter spine on the varices a little below the middle of the convex part, and two still smaller ones somewhat lower down, those on the antepenultimate varix falling opposite the lower end of the oval aperture, and those on the last a short distance below it on the right; lower part of the last whorl, with the exception of the end of the cauda, obliquely, finely, and rather rugosely lirate. Aperture roundly ovate, bluish white, two-banded; peritreme thin, produced; canal stained with brown behind, long, slender, a little oblique, very much closed, rather more than half as long as the entire shell. Operculum (fig. 3 a) reddish brown, composed of coarse concentric layers; nucleus nearly terminal.

Length 36 millims., diam. 11; aperture 7 long, and  $4\frac{1}{2}$  broad.

*Hab.* Stations 3 and 30. "Satanomosaki, 55 fathoms; Goto, 48 fathoms; Kuro-Sima, 29 fathoms" (A. Adams).

This appears to be a species which does not attain to a large size, and is remarkable for the fewness and smallness of the spines. Of the spiral liræ three are generally more prominent than the rest.

## 40. MUREX (PHYLLONOTUS) FALCATUS, Sowerby.

*Hab.* Stations 9 and 17.

For synonymy and distribution of this species consult Lischke's 'Japonische Meeres-Conchylien,' ii. p. 30.

## 41. MUREX (CERASTOMA) EMARGINATUS, Sowerby.

*Murex emarginatus*, Conch. Illust. figs. 98-100; Reeve, Conch. Icon. iii. f. i.

*Hab.* Stations 4 and 11. Kiusiu (*Lischke*).

The operculum is subpyriform, having the nucleus at the outer side at a short distance from the lower or smaller extremity. On the lower surface it has a smooth thickening along the outer edge, and the marks of muscular attachment consist of a few narrow concentric layers placed obliquely crossways. It is of a reddish-brown colour, paler at the outer margin.

## 42. MUREX (CERASTOMA) RORIFLUUS, Adams &amp; Reeve.

*Murex rorifluus*, Ad. & Reeve, Voy. Samarang, p. 38, pl. viii. f. 2 a, 2 b.

*Murex monachus*, Crosse, Journ. de Conch. 1862, vol. x. p. 55, pl. 1. fig. 8.

*Hab.* Station 4. Bay of Talienwhan, N. China (*Crosse*); Tsaulian (*A. Adams*, P. Z. S. 1862, p. 373); Nagasaki (*Lischke*). Korean archipelago (Samarang).

Crosse refers to the similarity of his species to *M. rorifluus*. The type of the latter is now in the Museum, and appears to me a very worn specimen of the same species described as *monachus*.

The specimen figured by Crosse is in bad condition and does not truly represent the usual character of the colour of Japanese specimens. In these the ground-colour is a dark chocolate-brown, which is interrupted by narrow transverse whitish lines, two in number on the upper whorls, and varying from four to eight on the last; they are a trifle elevated, especially upon the varices. The latter vary in number, sometimes being four on a whorl and sometimes five. All the eleven specimens from the Goto Islands are smaller than those from Talienwhan, and rather narrower. Owing to the bad state of the shells, Crosse was not enabled to notify the presence of a very short tooth-like projection near the base of the labrum. It is very small, but still is constant in all perfect shells. The operculum is almost precisely the same as that of the preceding species.

## 43. MUREX (MURICIDEA) CIRROSUS, var., Hinds.

*Murex cirrosus*, Hinds, P. Z. S. 1843, p. 128; Voy. Sulphur, 3. p. 9, pl. 3. f. 17, 18; Reeve, Conch. Icon. i. fig. 138.

*Hab.* Station 2. Straits of Macassar (*Hinds*); Andaman Islands (*Capt. Wilmer*).

The single specimen obtained by Capt. St. John off the coast of the Goto Islands is remarkable for the manner in which the transverse liræ at the upper part of the whorl are produced at the varices

into an upturned and curved hollow hook. Its canal too, like some examples from the Andaman Islands described by me (P. Z. S. 1878), is rather elongate, and directed to the left, or in an opposite direction to that of the type. Notwithstanding these differences, and a few other slight ones, I feel convinced that they all belong to one and the same species.

44. *MUREX (OCINEBRA) FIMBRIATULUS*, A. Adams. (Plate XX. fig. 31.)

*Trophon fimbriatulum*, A. Adams, P. Z. S. 1862, p. 375.

Shell turgidly subfusiform, turreted, fawn or light reddish, with a narrow interrupted brown band a little above the middle of the last whorl and almost obsolete above, and dark brown at the apex. Whorls 7, the two apical smooth, the rest sloping at the upper part and rather convex beneath, longitudinally nodosely plicated and spirally ridged; costæ or plicæ attenuated at the top of the whorls, rounded, about eleven on a whorl; on the last subnodose at the upper part or shoulder, attenuated and becoming obsolete inferiorly; spiral liræ about nine in number on the upper volutions, whereof the upper three or four on the slope are finer than those beneath, which appear at intervals to be somewhat imbricately scaled; last whorl rather suddenly contracted below the middle, with about twenty-eight transverse liræ, the interstices being moderately deep. Aperture ovate, pale pinkish or flesh-colour within; labrum thin and crenulated at the margin, strengthened with a strong imbricated exterior varix, extending downwards almost to the extremity of the cauda; columella arcuate, pale rose; canal closed, as long as the aperture, curved to the right, slightly retroverted and brown at the tip.

Length 19 millims., diam.  $7\frac{1}{2}$ .

*Hab.* Station 15.

Like *Murex japonicus* of Dunker, this species is remarkable for the absence of varices, with the exception of the postlabral one, in which respect it calls to mind certain species of *Tritonium*—for example, *T. strangei*, A. Adams and Angas; but in that and other allied species the canal is not closed.

45. *TROPHON*, sp.

*Hab.* Station 21.

This shell, I believe, is the young state of an undescribed species. It is subpyriform, white, purple at the apex, longitudinally plicate, and very beautifully spirally liræte, the liræ being most prettily imbricately scaled. The aperture, together with the canal, occupies two thirds of the entire length (10 millims.).

46. *UROSALPINX INNOTABILIS*. (Plate XX. fig. 32.)

Shell ovately or shortly fusiform, whitish, with two transverse somewhat interrupted brown lines on the last whorl, the upper one of which is visible on the upper volutions. Whorls 9; two apical smooth, convex; the rest turreted, concave at the upper part, then

rather strongly angulated at the middle; beneath with convex outlines, but sloping or contracted inwards, thus being narrower at the base than at the angle, stoutly plicate and coarsely spirally ridged; plicæ or costæ about nine on a whorl, equal in width to the interstices between them, becoming thinner or more or less obsolete in the concavity, on the last whorl attenuated below and produced to the extremity; transverse liræ stout, four or five beneath the angulation, prominent on the ribs, and the same number above the carination, rather finer than the preceding, about twenty in number on the body-whorl; the interstices between are deep, about as broad as the ridges, all of which are finely and somewhat closely imbricately scaled. Aperture half the length of the shell, white within, exhibiting about six tubercles near the labrum; columella smooth, covered with a thin white callosity, only a trifle oblique, tortuous below the middle; canal short, reflexed.

Length 20 millims., diam. 10.

Operculum with a lateral subterminal nucleus exteriorly.

*Hab.* Station 27.

This species is a close relation of *Trophon paiva*, Crosse, and *Trophon hanleyi*, Angas, which two species, judging from the shells alone, might conveniently be placed in Stimpson's genus *Urosalpinx*; but the operculum of both is fusoid, although not quite typical, and the odontophores have not been examined; therefore I prefer locating them provisionally in the genus *Fusus*. *Murex calcareus*, Dunker (Moll. Jap. p. 5, pl. 1. f. 2), also approaches this species very closely.

#### 47. *FUSUS NODOSO-PLICATUS*, Dunker.

*Fusus nodosoplicatus*, Dunker, Novitates Conchologicæ, Abtheil. ii. p. 99, pl. 33. f. 3, 4; Lischke, Japan. Meer.-Conch. ii. pl. 3. f. 6, variety.

*Hab.* Station 8\*. Nagasaki (*Lischke*).

#### 48. *FUSUS PERPLEXUS*, A. Adams.

*Fusus perplexus*, A. Adams, Journ. Linn. Soc. 1864, vol. vii. p. 106.

*F. inconstans*, Lischke, Japan. Meeres-Conch. i. pl. 2. f. 1-6, part ii. pl. 3. f. 1-5; Schacko, Jahrbücher der deutsch. malak. Gesellschaft, 1874, p. 115, pl. 6. f. 1-1 d (radula).

*Hab.* Stations 9 and 10.

I have no doubt of the identity of Lischke's shell with this species, for specimens of it in the Cumingian collection, probably received by Cuming from A. Adams, answer exactly the description in the 'Japan. Meeres-Conchylien.'

#### 49. *FUSUS NIGRIROSTRATUS*. (Plate XX. fig. 33.)

Shell fusiform, brownish, much streaked with very dark brown or black, especially between the plications, with white transverse liræ upon them; rostrum of the last whorl purplish black. Whorls 9, obliquely tabulated and a little concave above, then acutely angu-

lated, contracted to the base, longitudinally plicate, and prominently spirally ridged; plicæ suberect, becoming obsolete above the angulation, ten on the penultimate whorl; transverse liræ of different thicknesses, two around the middle and one at the lower suture of the whorls specially prominent, forming acute compressed transverse nodules upon the costæ; about fourteen on the upper whorls, all subgranose through being crossed by deep striæ of growth; on the body-whorl there is a fourth especially prominent lira falling within the aperture, just beneath the upper extremity of the labrum. Aperture bluish or purplish within, with the dark streaks of the exterior showing through, together with the canal equal to half the length of the shell; columella arcuate and whitish or livid above, oblique and purplish black below the middle; canal oblique, of moderate length, only a trifle reflexed.

Length 50 millims., diam. 17

*Hab.* Station 29.

The epidermis of this interesting form is of a brown colour, longitudinally, finely, and exceedingly closely lamellated, bearing upon the transverse liræ minute acute productions somewhat resembling short hairs.

#### 50. *FUSUS NIPONICUS*. (Plate XX. fig. 34.)

Shell fusiform, brownish white or sordid yellowish, stained at the upper part of the whorls with brown, and ornamented with a narrow zone of the same colour around the middle of the last whorl. Whorls 7, apical one smooth, mamillar, the rest longitudinally plicated and transversely ridged, sloping above, and then very convex; plicæ or ribs oblique, not much elevated, attenuated and faint at the upper ends, eleven in number on the last whorl, attenuating and vanishing just below the middle or convex portion. Transverse liræ numerous; most of them (about eleven on the penultimate whorl) are very fine, thread-like, and simple; but two or three stouter than the preceding, and situated at some distance apart at the middle portion of the whorls, on crossing the plicæ are elevated into compressed and transversely elongated tubercles; suture prettily wavy, margined with the thickened upper edge of the volutions; last contracted below the middle, and produced into an elongated cauda, which is obliquely and rather closely and finely lirate; the transverse ridges, which become tubercular, number about six or seven on this volution, three of them being more conspicuous than the others. Aperture with the canal equal to about four sevenths of the whole length, whitish within; columella smooth, thinly enamelled, tortuous; canal elongate, narrow, oblique.

Length 22 millims., width 7.

*Hab.* Station 25.

The two specimens of this delicately sculptured species do not, I imagine, represent the ultimate size to which in all probability it attains. The coloured bands are not very conspicuous; and the entire surface is sculptured by the lines of growth, those immediately beneath the suture being arcuate and especially observable.

51. *FUSUS SIMPLEX*. (Plate XX. fig. 35.)

Shell fusiform, white, clothed with a smooth greyish-olive epidermis. Whorls sloping and slightly concave at the upper part, bulging beneath and contracted at the base, carinately margined above at the suture, obliquely nodosely plicate and spirally lirate; plicæ or costæ eight or nine on the upper whorls, rounded, large, almost obsolete at the upper part; spiral liræ about six in number on a whorl, whereof three around the lower portion are the stoutest; besides these liræ, at times a few fine thread-like lirulæ are present in the interstices. Last whorl with the costæ not extending below the middle, lirate throughout, the liræ on the rostrum being very fine and close together. Aperture suboval, together with the canal equal in length to the spire above it; columella arcuate above, tortuous beneath; canal shorter than the aperture and a little recurved.

Length 18 millims., diam.  $5\frac{1}{2}$ .

*Hab.* Station 29.

The shell above described may possibly not be of adult growth. It consists of but seven whorls, which is a small number for a species of true *Fusus*. However, I cannot identify it as the young state of any described species. It is remarkable for the absence of colouring of any kind and the shortness of the canal. The thickened margin of the whorls is rather oblique and scarcely undulating, as the longitudinal plicæ are somewhat obsolete at the lower part as well as above.

52. *FUSUS COREANICUS*. (Plate XX. fig. 36.)

Shell fusiform, dirty diluted flesh-colour, streaked with dark brown upon the costæ. Whorls  $7\frac{1}{2}$ –8; nucleus consisting of one and a half to two whorls, smooth, globose; remaining volutions sloping and a trifle excavated above, margined at the suture, somewhat angular at the middle, a little convex beneath and much contracted at the base, longitudinally costate and transversely ridged; costæ or plicæ only slightly prominent, but little oblique, twelve in number on the penultimate whorl; spiral liræ close-set, pretty regularly alternately fine and coarser, about twelve on a whorl, whereof three or four around the lower half are larger than the rest and subnodulous on the ribs; the latter become obsolete about the middle of the body-whorl, which is rather suddenly contracted just below that point, and produced into a short oblique rostrum. Aperture ovate, fuscous within, with the canal occupying only five elevenths of the entire length; columella smooth, arcuate above, very oblique inferiorly; canal short, slightly retroverted.

Length 22 millims., diam. 8.

*Hab.* Station 29.

This species is remarkable for the brevity of the canal and the style of colouring. The dark stripes always appear to fall upon the ribs, and they are somewhat interrupted by the stoutest of the transverse liræ, which are rather nodulous and dirty whitish. The thickened margin at the top of the whorls is also pale.

53. *FUSUS PACHYRHAPHE*. (Plate XX. figs. 37, 37a.)

Shell shortly fusiform, biconical, dull light brown, pale at the angulation of the whorls. Whorls 8, of which the two apical are smooth and convex; the rest slopingly excavated above, rather sharply angled at the middle, and flattish beneath, longitudinally plicate and spirally grooved and ridged; plicæ eight or nine on a whorl, attenuating in the concavity, and again becoming more developed upon a thickening at the upper margin of the whorls consisting of two prominent liræ; the transverse ridges are all beautifully imbricately squamous through the elevated undulating lines of growth; two or three beneath the angle stouter than the rest and subnodulous upon the plicæ; on the penultimate whorl there are about from eight to nine, and on the last about twenty-two, generally alternately fine and coarser; the costæ attenuate inferiorly and extend almost to the extremity. Aperture elongate, more or less tinged within with fleshy brown, with the canal being rather longer than the spire, armed with about six short liræ, which do not attain to the crenulated margin of the lip; columella livid pinkish, straightish above, and oblique below the middle; canal short and recurved.

Length 21 millims., diam 9. Length of aperture and canal 12. A smaller specimen is 16 long, 6 broad, and the aperture has a length of 8 millims. (Fig. 37a.)

*Hab.* Stations 8 and 27.

The largest specimen from the latter locality differs from the rest in having one plication less on a whorl, and the aperture proportionally longer. In all other respects it agrees; and I feel convinced that they all belong to one and the same species. It belongs to the same section of *Fusus* as *F. imbricatus*, Smith, from New Caledonia.

54. *SIPHONALIA CASSIDARIIFORMIS*, Reeve.

*Buccinum cassidariæformis*, Reeve, Conch. Icon. iii. fig. 11; Lischke, Jap. Meer.-Conch. i. p. 38, pl. 4. f. 1-10 (as *Siphonalia*).

*Hab.* Stations 5 and 17.

The operculum of *Siphonalia* is described by A. Adams as fusoid. In this species it is not of the typical form, as the nucleus, instead of being terminal, is situated within the outer margin at the distance of three millimetres from the lower or narrowed extremity.

55. *SIPHONALIA SPADICEA*, Reeve. (Plate XX. fig. 38.)

*Buccinum fusoides*, Reeve, Conch. Icon. iii. pl. 9. f. 64.

*Buccinum spadiceum*, Reeve, l. c. (Errata).

*Siphonalia spadicea*, A. Ad. Ann. & Mag. Nat. Hist. 1863, vol. xi. p. 203.

*Hab.* Stations 25 and 32, and Port Hamilton, 10 fathoms, 34° 32' N. lat., 127° 15' E. long. "Mino-Sima 63 fathoms" (A. Ad.).

The specimen described by Reeve is somewhat worn and the colouring faded. In fresh examples, besides the brownish irregular blotching, chiefly between the plications, there are certain of the

51. *FUSUS SIMPLEX*. (Plate XX. fig. 35.)

Shell fusiform, white, clothed with a smooth greyish-olive epidermis. Whorls sloping and slightly concave at the upper part, bulging beneath and contracted at the base, carinately margined above at the suture, obliquely nodosely plicate and spirally lirate; plicæ or costæ eight or nine on the upper whorls, rounded, large, almost obsolete at the upper part; spiral liræ about six in number on a whorl, whereof three around the lower portion are the stoutest; besides these liræ, at times a few fine thread-like lirulæ are present in the interstices. Last whorl with the costæ not extending below the middle, lirate throughout, the liræ on the rostrum being very fine and close together. Aperture suboval, together with the canal equal in length to the spire above it; columella arcuate above, tortuous beneath; canal shorter than the aperture and a little recurved.

Length 18 millims., diam.  $5\frac{1}{2}$ .

*Hab.* Station 29.

The shell above described may possibly not be of adult growth. It consists of but seven whorls, which is a small number for a species of true *Fusus*. However, I cannot identify it as the young state of any described species. It is remarkable for the absence of colouring of any kind and the shortness of the canal. The thickened margin of the whorls is rather oblique and scarcely undulating, as the longitudinal plicæ are somewhat obsolete at the lower part as well as above.

52. *FUSUS COREANICUS*. (Plate XX. fig. 36.)

Shell fusiform, dirty diluted flesh-colour, streaked with dark brown upon the costæ. Whorls  $7\frac{1}{2}$ –8; nucleus consisting of one and a half to two whorls, smooth, globose; remaining volutions sloping and a trifle excavated above, margined at the suture, somewhat angular at the middle, a little convex beneath and much contracted at the base, longitudinally costate and transversely ridged; costæ or plicæ only slightly prominent, but little oblique, twelve in number on the penultimate whorl; spiral liræ close-set, pretty regularly alternately fine and coarser, about twelve on a whorl, whereof three or four around the lower half are larger than the rest and subnodulous on the ribs; the latter become obsolete about the middle of the body-whorl, which is rather suddenly contracted just below that point, and produced into a short oblique rostrum. Aperture ovate, fuscous within, with the canal occupying only five elevenths of the entire length; columella smooth, arcuate above, very oblique inferiorly; canal short, slightly retroverted.

Length 22 millims., diam. 8.

*Hab.* Station 29.

This species is remarkable for the brevity of the canal and the style of colouring. The dark stripes always appear to fall upon the ribs, and they are somewhat interrupted by the stoutest of the transverse liræ, which are rather nodulous and dirty whitish. The thickened margin at the top of the whorls is also pale.



53. *FUSUS PACHYRHAPHE*. (Plate XX. figs. 37, 37a.)

Shell shortly fusiform, biconical, dull light brown, pale at the angulation of the whorls. Whorls 8, of which the two apical are smooth and convex; the rest slopingly excavated above, rather sharply angled at the middle, and flattish beneath, longitudinally plicate and spirally grooved and ridged; plicæ eight or nine on a whorl, attenuating in the concavity, and again becoming more developed upon a thickening at the upper margin of the whorls consisting of two prominent liræ; the transverse ridges are all beautifully imbricately squamous through the elevated undulating lines of growth; two or three beneath the angle stouter than the rest and subnodulous upon the plicæ; on the penultimate whorl there are about from eight to nine, and on the last about twenty-two, generally alternately fine and coarser; the costæ attenuate inferiorly and extend almost to the extremity. Aperture elongate, more or less tinged within with fleshy brown, with the canal being rather longer than the spire, armed with about six short liræ, which do not attain to the crenulated margin of the lip; columella livid pinkish, straightish above, and oblique below the middle; canal short and recurved.

Length 21 millims., diam 9. Length of aperture and canal 12. A smaller specimen is 16 long, 6 broad, and the aperture has a length of 8 millims. (Fig. 37a.)

*Hab.* Stations 8 and 27.

The largest specimen from the latter locality differs from the rest in having one plication less on a whorl, and the aperture proportionally longer. In all other respects it agrees; and I feel convinced that they all belong to one and the same species. It belongs to the same section of *Fusus* as *F. imbricatus*, Smith, from New Caledonia.

54. *SIPHONALIA CASSIDARIIFORMIS*, Reeve.

*Buccinum cassidariæformis*, Reeve, Conch. Icon. iii. fig. 11; Lischke, Jap. Meer.-Conch. i. p. 38, pl. 4. f. 1-10 (as *Siphonalia*).

*Hab.* Stations 5 and 17.

The operculum of *Siphonalia* is described by A. Adams as fusoid. In this species it is not of the typical form, as the nucleus, instead of being terminal, is situated within the outer margin at the distance of three millimetres from the lower or narrowed extremity.

55. *SIPHONALIA SPADICEA*, Reeve. (Plate XX. fig. 38.)

*Buccinum fusoides*, Reeve, Conch. Icon. iii. pl. 9. f. 64.

*Buccinum spadiceum*, Reeve, l. c. (Errata).

*Siphonalia spadicea*, A. Ad. Ann. & Mag. Nat. Hist. 1863, vol. xi. p. 203.

*Hab.* Stations 25 and 32, and Port Hamilton, 10 fathoms, 34° 32' N. lat., 127° 15' E. long. "Mino-Sima 63 fathoms" (A. Ad.).

The specimen described by Reeve is somewhat worn and the colouring faded. In fresh examples, besides the brownish irregular blotching, chiefly between the plications, there are certain of the

spiral ridges, subequidistantly placed, of a rich reddish-brown colour. The operculum is typically fusoid, having a terminal nucleus, and differing in this respect from that of *S. cassidariaformis*, thus showing how variable and unreliable the operculum is as a divisional character.

56. *EUTHRIA FERREA*, Reeve. (Plate XX. figs. 39, 39a.)

*Buccinum ferreum*, Reeve, Conch. Icon. iii. 1847, p. 102.

*Fusus viridulus*, Dunker, Moll. Japon. 1861, p. 3, pl. 1. f. 16; Lischke, Jap. Meer.-Conch. i. pl. 5. f. 5, 6; Smith, Ann. & Mag. Nat. Hist. 1875.

*Hab.* Stations 8\* and 28. "Tsu-Sima, O-Sima, and Nagasaki (*A. Ad.*); Decima and Nagasaki (*Lischke*).

The type of this species is in a worn condition, and entirely destitute of the olivaceous epidermis exhibited by fresh specimens. However, there is not a shadow of doubt that it is identical with the shell described by Dunker as *Fusus viridulus*. It is a species subject to considerable variation in form, some examples being considerably more robust than others. Its operculum is typically fusoid, with an apical nucleus.

57. *TRITONIDEA SUBRUBIGINOSA*. (Plate XX. fig. 40.)

Shell ovate, dark brown, with a luteous band around the middle of the last whorl, which is also partly seen upon the upper whorls just above the suture; tip of the body-whorl luteous. Volutions  $6\frac{1}{2}$ , the one and a half at the apex smooth; the rest very convex, obliquely plicated and spirally ridged; plicæ or costæ large, swollen, broader than the interstices, ten in number on the penultimate whorl; transverse liræ four or five on a whorl, with finer intermediate ones, a trifle thickened upon the plicæ; the latter become obsolete upon the last whorl about the periphery. It is encircled throughout by spiral ridges, some of which at the basal extremity and between the strong ones above are very fine. Aperture occupying rather less than half the entire length, livid blue within; labrum thickened exteriorly with a large tumid varix, thin and crenulated at the margin, armed within with about eight liræ, which are thickest at the end towards the lip; columella covered with a thin callus, arcuate above, with a somewhat dentiform prominence at the middle, and one or two tubercles close to it, and another small elongate one above close to the termination of the outer lip; canal oblique.

Length 17 millims., diam. 7.

*Hab.* Station 8\*.

This interesting little shell might, at first glance, be mistaken for a diminutive form of *Buccinum rubiginosum*, Reeve. It is, however, distinguished by fewer whorls, whereof the nuclear ones are actually larger than those of *T. rubiginosa*, and also by difference of coloration and the shorter aperture. The operculum is fusoid, with the nucleus terminal.

## 58. COLUMBELLA SCRIPTA, Lamarck.

*Columbella scripta*, Kiener, Coq. Viv. p. 50, pl. 6. f. 3, 3a.

*Columbella versicolor*, Sowerby, Thesaurus, f. 41-46; Reeve; Conch. Icon. f. 51a, b.

*Columbella variegata*, Menke, Synops. p. 65.

*Columbella bidentata*, Menke, Moll. Novæ Hollandiæ, p. 23; Sowb. Thes. f. 53, 54; Reeve, f. 205.

*Hab.* Station 8\*.

This species has a wide geographical range, having been recorded from the Philippine Islands, North and South Australia, Annaa Island, and New Caledonia.

## 59. COLUMBELLA SAGENA, Reeve.

*Columbella sagena*, Reeve, Conch. Icon. fig. 162; Lischke, Jap. Meeres-Conch. i. p. 58, iii. p. 34, pl. 2. f. 5-7.

*Hab.* Stations 8\* and 18.

The variation of this species has been already remarked upon by Lischke. The epidermis, which is generally for the most part worn off when the shell arrives at maturity, is of a dull olivaceous colour and finely lamellated, the lamellæ being perpendicular and close together.

## 60. COLUMBELLA UNDATA, Duclos.

*Columbella undata*, Duclos, Monograph, pl. 4. f. 4; Kiener, pl. 9. f. 1, pl. 12. f. 3; Lischke, iii. pl. 2. f. 1-4.

*Hab.* Stations 8\* and 29.

## 61. COLUMBELLA MISERA, Sowerby.

*Columbella misera*, Sowerby, Thesaurus, fig. 111; Reeve, Conch. Icon. fig. 68; Lischke, i. p. 59, ii. p. 48, iii. p. 35, pl. 2. f. 10, 11.

*Hab.* Station 8\*. Nagasaki (*Lischke*); Sandwich Islands (*Pease* and *Martens*).

The number of costæ in this species is considerably variable, there being in some specimens fifteen on the last whorl, whilst in others there are but ten. A pretty constant character of the painting consists of the upper half of the whorls being unspotted, and the costæ on that portion opaque snow-white.

## 62. COLUMBELLA (ATILIA) LISCHKEI. (Plate XX. fig. 41.)

Shell fusiform, narrow, dirty white, blotched at intervals with olive-brown. Whorls 8; two apical smooth, globose, rather large, the one or two following longitudinally strongly costate; ribs thick, with a thin vitreous upper margin; the remaining volutions a trifle convex, smooth, with minute striations or lines of growth; the last suddenly contracted below the middle, where it is obtusely angulated, sculptured at the caudal extremity with about eight narrow oblique sulci or striæ. Aperture small, indistinctly quadrangular, occupying rather more than one third of the entire length; outer lip with a

broad swollen varix externally, thin at the margin, armed within with about six subtubercular lirations; columella very little oblique above, slightly convex, more inclined below the middle, invested with a very thin callous deposit, united above to the outer lip and not obscuring the oblique sulci around the caudal end of the whorl; canal distinct, faintly reflexed.

Length 11 millims., diam.  $3\frac{1}{2}$ .

*Hab.* Station 27.

Compared with *C. alabastrum*, Reeve, its nearest ally, this species is more elongated, has more numerous and shorter whorls, and is differently coloured. The brown maculations extend from suture to suture, and gradually increase in size as the whorls enlarge. On the base of the last whorl there are a few longitudinal streaks of the same colour.

63. *COLUMBELLA* (*ATILIA*) *NIVEOMARGINATA*. (Plate XX. fig. 42.)

Shell elongate, greyish white, with an opaque white band spotted with brown at the top of the whorls, and a narrower one around the middle of the last whorl, the rest of the surface being marked with opaque white in an irregularly closely reticulating manner. Volutions 8-9; the apical ones smooth, the one or two succeeding longitudinally costate, the rest almost flat, separated by a deep suture, so that the spire appears somewhat turreted; body-whorl transversely sulcate below the middle. Aperture small, occupying rather more than two fifths of the whole length of the shell, whitish within; labrum with an exterior varicose thickening and five or six small tubercles within, of which the uppermost is the largest; the margin near the upper extremity is faintly sinuated; columella suberect above, oblique below the middle, where there is a small notch or oblique groove, coated with a callosity with a thickened margin; canal short, recurved.

Length 11 millims., diam.  $3\frac{1}{2}$ .

*Hab.* Station 8.

The brown markings upon the opaque white zone at the upper margin of the whorls are small and in the form of somewhat irregular oblique short lines or stripes, some of them here and there being more like a blotch or irregular spot. The band at the middle of the last whorl is only half as broad as that above; and the spotting upon it is also paler and closer. Only a single specimen was obtained.

64. *COLUMBELLA* (*ATILIA*), sp.

*Hab.* Stations 1 and 30.

The two specimens of this species, which, I believe, is undescribed, are both of immature growth. They consist of eight whorls, whereof the three uppermost are glassy and faintly tinged with violet. The rest are flattish, smooth, of a transparent white colour, painted with close longitudinal olive-brown lines, interrupted by two broad trans-

verse bands of the same colour spotted with white, one above and the other below the suture. The body-whorl has a third similar band near the middle, and is obliquely finely grooved at the base. The banding upon the specimen from station 30 is less definite, and the form of the shell, too, is rather more slender.

Length 12 millims., diam. 5.

65. *COLUMBELLA* (*ZAFRA*) *SUBVITREA*. (Plate XX. fig. 43.)

Shell fusiformly ovate, subpellucid, white, with a thin indistinct brown line interrupted by the costæ around the lower part of the whorls, and a transparent pellucid zone at the top, with a second band or series of short flames just below the middle of the last whorl, which is stained with brown at the extremity. Whorls 7, the first two convex, smooth, the following two or two and a half almost flat and likewise smooth, the rest strongly costate; costæ about eleven on a whorl, rounded, a little oblique, and more or less arcuate, narrowed and subobsolete at the upper extremity, disappearing a little below the middle of the body-whorl, the lower extremity or cauda of which is transversely and a little obliquely sculptured with five or six striæ, whereof the two or three uppermost are wider apart than the rest. Aperture narrow, occupying rather less than half the shell's entire length; labrum thin, faintly and broadly emarginate, or sinuated just beneath the suture, smooth within; columella a trifle oblique, tinged with brown, a little convex or swollen at the middle, covered with a thin callosity with a defined margin, which unites at the upper extremity with the termination of the outer lip; basal canal short, rather deep, and in a slight measure recurving.

Length 4 millims., width  $1\frac{1}{2}$ .

*Hab.* Station 25.

The genus *Zafra* is described by A. Adams in the 'Annals and Magazine of Natural History,' 1860, vol. vi. p. 331. He considers that it belongs to the Turridæ or Pleurotomidæ. In his description he does not state whether the labrum bears internal liræ or denticles. I have examined a specimen of the typical species, and I do not discover their presence. The absence of these denticles appears to be the only character which distinguishes this group from the genus *Seminella* of Pease ('American Journal of Conchology,' 1867, vol. iii. pp. 233 & 234). In size and style of sculpture the species of the latter genus answers to the description of *Zafra*; and I am inclined notwithstanding that their lips are toothed within, to include them in that genus. It is possible that *Z. mitriformis* and *Z. subvitrea* in the very adult state at times may exhibit denticles.

The latter species differs from the former in being narrow, differently coloured, and having the costæ obsolete on all except the last two and a half whorls. *Anachis zonata*, Gould (?=*Zafra mitriformis*), and *Anachis virginea* of the same author, also should be classed with *Zafra*.

66. *COLUMBELLA* (*AMYCLA*) *VARIANS*, Dunker. (Plate XX. figs. 44-44b.)

*Amycla varians*, Dkr. Mal. Blät. 1860, vi. p. 231; Moll. Jap. pl. 1. f. 17; Lischke, J. M.-Conch. ii. p. 49.

*Hab.* Stations 5, 7, 8\*, 10, 11, and 28.

This remarkably variable species is but poorly figured in Dunker's work. The illustration above cited represents the spire much more obtuse at the apex than is usual. The operculum is purpuroid. The following measurements will show how variable is the size of different specimens:—

Length	13 millims.,	diam.	5 $\frac{1}{3}$
"	11	"	5
"	10	"	4
"	11 $\frac{1}{2}$	"	4

67. *NASSA* (*ALECTRION*) *GLANS*, Linn.

*Nassa glans*, Kiener, Coq. Viv. pl. 15. f. 52; Reeve, Con. Icon. fig. 5.

*Hab.* Station 7. Philippine Islands and Australia are other localities.

The operculum of the single specimen of this species is of a bright vinous red colour, of an elongate subtrigonal form, the angles being rounded and the margins simple. The shell itself differs from the ordinary form of the species in having a less elongated spire, and the body-whorl less inflated and encircled with only eight red lines instead of nine.

68. *NASSA* (*ZEUXIS*) *SIQUIJORENSIS*, A. Adams. (Plate XX. figs. 45, 45 a.)

*Nassa siquijorensis*, A. Adams, P. Z. S. 1851, p. 97; Reeve, Con. Icon. figs. 53 a, b; A. Ad. Ann. & Mag. Nat. Hist. 1870, vol. v. p. 425 (*Zeuxis*).

*Hab.* Station 19. Tsaulian, Tomo, Seto-Uchi (*Adams*), Philippine Islands (*Cuming*).

The costæ in the Japanese specimen are fewer than in the originally described examples. In the latter the penultimate whorl has about 32 upon it, whilst the same volution in the former has but 22 to 24; in one specimen, however, there is the normal number. The largest example is 28 millims. long and 12 wide. The operculum (fig. 45a) is rather elongate, brown, serrated along the outer margin and also on the inner edge for a short distance from the nucleus.

69. *NASSA* (*ZEUXIS*) *VARICIFERA*, A. Adams, var.

*Nassa varicifera*, A. Adams, P. Z. S. 1851, p. 108; Reeve, Con. Icon. viii. figs. 118 a, b; A. Ad. Ann. & Mag. Nat. Hist. 1870, vol. v. p. 425; Gen. Rec. Moll. i. pp. 119 & 121 (as *Zeuxis* & *Hima*).

*Hab.* Station 31. Tsaulian (*Ad.*).

Only a single non-adult specimen was dredged at the above spot. It is most beautifully sculptured with very fine costæ, which

are coarsest on the upper whorls, gradually becoming finer on the penultimate, and then nearly obsolete on the last. Notwithstanding this difference from the types, in which the ribs become thicker from the upper part downwards, its more slender form, more convex whorls, and more turreted spire, I believe this shell to be a delicately sculptured form of this species; for the colouring and the peculiar varices are of precisely the same character. The operculum is coarsely serrated along the outer margin.

70. *NASSA* (*NIOtha*) *STIGMARIA*, A. Adams.

*Natha stigmara*, A. Adams, P. Z. S. 1851, p. 96; Reeve, Con. Icon. fig. 42.

*N. densigranata*, A. Ad., Reeve, fig. 181.

*Hab.* Station 10. Philippine Islands (*Cuming*), Ooshima (*Capt. St. John*), Andaman Islands (*Capt. Wilmer*).

This species is subject to considerable variation in size. The type figured by Reeve is the largest specimen I have seen, being 20 millims. long and  $10\frac{1}{2}$  broad. Another, the type of *densigranata*, has a length of 12 millims. and a breadth of  $6\frac{1}{2}$ .

71. *NASSA* (*HIMA*) *FESTIVA*, Powis.

*Nassa festiva*, Powis, Reeve, Conch. Icon. fig. 117.

*N. lirata*, Dkr. Moll. Jap. pl. 1. f. 22.

*Hab.* Station 8\*. Other localities recorded are Decima, Nagasaki, and Hakodadi.

The home first assigned to this species, namely Panama and St. Helena, is only one of the numerous errors occurring in the Cumingian Collection. If this had not occurred, Dunker would never have redescribed the species.

72. *NASSA* (*HIMA*) *FRATERCULUS*, Dunker.

*Nassa fraterculus*, Dkr. Moll. Jap. pl. 1. f. 15; Lischke, J. M.-Conch. ii. pl. 4. f. 7-8; Schrenck, Reise Amurland, p. 435.

? *N. plebeculu*, Gould, Proc. Bost. Soc. Nat. Hist. 1860, p. 332; Otia Conch. p. 128.

*Hab.* Stations 5 and 8\*. Other localities are Decima, Ousima, Hakodadi, Tatiyama, Simoda, Nagasaki, and O-Sima.

One specimen differs from the rest in having fine transverse brown lines on the raised ridges between the grooves, and not in the latter as is usual. Another one is black with a single median narrow yellow zone.

73. *NASSA* (*HIMA*) *TENUIS*, Smith.

*Nassa tenuis*, Smith, Ann. & Mag. Nat. Hist. 1875, xv. p. 423.

*N. japonica*, Lischke, Jap. M.-Conch. iii. p. 37, pl. 2. f. 20-23.

?? *N. japonica*, A. Ad. P. Z. S. 1851, p. 110.

*Hab.* Station 21.

The type of Adams's species described from the Cumingian Collection is not to be found. On this account, and considering that

Adams's description is far too brief and vague for identification of the species, I am induced to retain the name *tenuis* imposed upon it by myself in the Annals of 1875.

74. *NASSA* (HIMA) *ACUFIDENDATA*. (Plate XX. fig. 46.)

Shell ovate, acuminate above, thick, reddish brown with a white zone round the middle of the upper whorls and two on the last, and again pale at the extremity. Volutions 7; two embryonal smooth, mamillar, convex; the rest a little convex, divided by a deep and almost channelled suture, ornamented with longitudinal ribs (18 on the penultimate whorl) and transverse liræ, which are granuliferous upon the costæ; they are usually four in number upon the upper whorls; but in some instances a fifth finer one is observed just beneath the suture; on the last whorl there are nine or ten granulous ones, then about five simple oblique ridges on the extremity or short cauda, whereof the uppermost is the stoutest and carinæform. Aperture small, ovate, whitish, with three dark brown bands within, one central, one superior, and the other at the basal extremity corresponding to the exterior banding of the whorl; labrum with an exterior varix, and armed within at a little distance from the extreme edge with 5-6 denticles, whereof one, the fourth from the base, is conspicuously larger than the rest and rather acute, and the one or two above that are more or less obsolete; columella much arcuated, coated with a small thin callus, thickened at its edge, bearing at the upper part a liræform tubercle and four or five smaller ones beneath it.

Length 10 millims., diam.  $4\frac{1}{2}$ .

*Hab.* Stations 5 and 8\*.

This species is painted very much in the same manner as *N. tenuis*. It differs, however, from that species in the smaller number of the whorls, in form, and the character of the aperture and its armature. Twelve specimens were examined.

75. *NASSA* (HIMA) *LUTEOLA*. (Plate XX. fig. 47.)

Shell small, elongate, yellow: whorls 6; the two nuclear globose, the rest convex, costate, and transversely lirate; costæ twenty in number on the penultimate volution, a little oblique; liræ nodulous on the ribs, four to five on the upper whorls, six on the penultimate, and about eleven on the last, the cauda of which is grooved. Aperture small, ovate, yellow; lip exteriorly variced, thin at the margin, and lirate within; columella considerably arched, covered with a callosity, bearing a tubercle above and exhibiting traces of another below.

Length 7 millims., diam.  $3\frac{1}{4}$ .

*Hab.* Station 7.

This little shell, of which there is but one in the collection, is chiefly characterized by its diminutive proportions and the uniformity of coloration. The tuberculation upon the columella is hardly definable, and probably has been absorbed by the little *Pagurus* inhabiting the shell.



76. *CORALLIOPHILA JEFFREYSII*. (Plate XX. fig. 48.)

Shell shortly fusiform, reddish brown, transverse ridges, especially at the middle of the whorls, white: whorls probably 8; the six that are left acutely angular at the middle, spirally deeply sulcated, leaving very prominent ridges between the sulci, longitudinally obsoletely plicate; the liræ are six in number on the penultimate whorl, the third from the base being the most prominent, forming the angles, acutely produced on crossing the plicæ, and closely, rather coarsely imbricately scaled; last whorl encircled with sixteen liræ, with the scales on some of the lower ones remarkably thickened and prominent, terminated with a large prominent scaled ridge. Aperture bluish within, with the canal equal to the spire, internally finely lirate; canal short, very oblique and recurved; columella straightish at the upper part.

Length 20 millims., diam. 10.

*Hab.* Station 22.

This species is much of the same type as *Murex lamellosus* of Philippi. It differs from it, however, in colour, the deeper sulci, and the greater angulation of the whorls.

The location of it in the genus *Coralliophila* is only provisional. The sculpture is just of the character which frequently obtains in many species of that genus; but the brownish red colour is unusual.

77. *PURPURA BRONNI*, Dunker.

*Purpura bronni*, Dunker, Moll. Jap. pl. 1. f. 23; Lischke, Jap. M.-Conch. i. p. 53, pl. 5. f. 17.

*Hab.* Station 4. Nagasaki and Decima (*Lischke* and *Dkr.*); Tatiyama (*A. Adams*).

78. *PURPURA ALVEOLATA*, Reeve.

*Purpura alveolata*, Con. Icon. iii. fig. 60; Smith, Ann. & Mag. Nat. Hist. 1875, vol. xv.

*P. clavigera*, Küster, Con. Cab. pl. 31a. f. 1; Lischke, Jap. Meer.-Conch. i. p. 54, pl. 5. f. 12-14, part ii. p. 39.

*Hab.* Station 4. Nagasaki (*Lischke*).

The habitat "Panama," originally assigned to this species, is evidently incorrect.

79. *SISTRUM UNDATUM*, Chemnitz.

*Murex undatus*, Chem. Con. Cab. xi. p. 124, f. 1851-2.

*Murex margariticola*, Broderip, P.Z.S. 1832, p. 177; Reeve, Con. Icon. iii. f. 178.

Var. = *Ricinula fiscellum*, Reeve (not *Murex fiscellum*, Chemnitz), Con. Icon. iii. f. 28.

*Hab.* Station 4.

This species is very widely distributed. It has been recorded from Lord Hood's island and New Caledonia, besides Japan; and in the British Museum there are specimens from Swan River, Port Essington (*Jukes*), Andaman Islands (*Captain Wilmer*), Singapore

(*Dr. Livesay*), and Louisiade archipelago (*Macgillivray*, Voyage of 'Rattlesnake').

80. MITRA (COSTELLARIA) SUBTRUNCATA, Sowerby.

*Mitra subtruncata*, Sowerby, Thesaurus Con. iv. pl. 360. f. 405, sp. 468.

*Hab.* Ooshima harbour, 8 fathoms, on a bottom of sandy mud and broken shells.

Mr. Sowerby remarks that in sculpture this species resembles *M. obeliscus*. Judging from his figure and the specimens which I believe to belong to this form, this statement requires some qualification. To a certain extent there is some similarity; but the costellæ in *M. obeliscus* are finer and more numerous, and the spiral sulci between them much deeper than in *M. subtruncata*. The ribs, too, in the former are subgranulous at the points where the spiral liræ between the sulci come into contact with them, whilst in the latter they are smooth and regular. The columella has five plaits, *M. obeliscus* only four.

81. MITRA (COSTELLARIA) FUSCO-APICATA. (Plate XX. fig. 49.)

*Mitra (Costellaria) suluensis*, Smith (non Ad. and Rve.), Annals and Mag. Nat. Hist. 1875, xv. p. 425.

Shell fusiform, whitish, stained with brown at the apex, obscurely banded with bluish ash a little below the top of the whorls, and spotted irregularly with brown in the same part, generally between the costæ; lower half of the last whorl cinereous brown. Whorls 10, one to two apical ones smooth, globose, the rest almost flat at the sides, scarcely turreted, longitudinally ribbed and spirally sulcated between the costæ; the latter are about 17 in number on the penultimate whorl, a little arcuate and oblique, about half as broad as the interspaces between them; spiral sulci interrupted by the costæ, five on the upper whorls, moderately deep, subequidistant; the ribs on the body-whorl alternate at the base, and at this part are cut across by the oblique transverse grooves, producing nodules upon them; one of the ridges between the sulci, which is in a line or continuous with the uppermost fold on the columella, is conspicuous, being a little thicker than the rest. Aperture generally internally lirate, small, narrow, with a white band within a little above the middle, and two interrupted brown zones, one above and the other below the white one; columella with a callus near the extremity of the labrum, with four folds, the two uppermost grooved so as to appear duplex; canal recurved.

Length 24 millims., diam. 7; aperture 9 long, 2 wide.

*Hab.* Station 19. Ooshima harbour (Annals 1875).

This species is closely allied to *M. suluensis*, Ad. and Rve., with which I formerly confounded it; it differs in having a non-turreted spire, finer spiral sculpture, a shorter aperture, and the colour, too, a little different. The bluish-ash zone at the upper part of the whorls in some specimens is almost entirely wanting, so that the

shell is divided into two parts, the upper, with the exception of the brown apex, being white or bluish white, and the lower ashy brown.

82. MITRA (COSTELLARIA) COLLINSONI, A. Adams. (Plate XX. fig. 50.)

*Mitra* (*Costellaria*) *collinsoni*, A. Adams, Journal Linn. Soc. 1864, vol. vii. p. 200; Sowerby, Thes. Conch. figs. 621, 622 (merely caricatures); Smith, Annals and Mag. Nat. Hist. 1875, vol. xv. p. 425.

*Hab.* Station 9. Also Kino-o-Sima (*A. Ad.*), Ooshima and Matoza (*Capt. St. John*).

This species has four plicæ on the columella, and not three as stated by Adams. In the white zone which occupies the lower half of the whorls there is a brown line interrupted by the costellæ, in this respect agreeing with *M. bronni*, Dunker, which is known to me only by the description, from which it appears to be a stouter shell.

83. MITRA (COSTELLARIA) GOTOENSIS. (Plate XX. fig. 51.)

Shell like the preceding species (*M. collinsoni*); but with thicker costæ and consequently narrower interstices, white, stained with light purplish brown at the inferior margin of the upper whorls, and with the lower half of the last of the same colour; apex also stained with brown: whorls 9, a trifle convex; costæ 18 on a whorl, slightly arcuate; interstices transversely sulcated; sulci six to seven on the penultimate whorl, and about sixteen on the last; columella quadruplicate; aperture small, internally lirate, white at the margin of the lip.

Length  $13\frac{1}{3}$  millims., diam. 4; length of aperture 5.

*Hab.* Station 7.

84. MITRA (PUSIA) ÆMULA. (Plate XX. fig. 52.)

Shell fusiformly ovate, blackish brown, with a narrow yellow line round the middle of the whorls, and yellow at the upper margin, and a second line on the last whorl rather below the middle; clothed with an olive epidermis obscuring the colouring: whorls 8, slightly convex, with stoutish longitudinal costæ, about fourteen in number on the penultimate revolution, attenuated and obsolete just before the five oblique stoutish liræ encircling the cauda; interstices smooth, about as broad as the ribs. Aperture small, dark brown, with two yellow transverse lines, lirate far within; columella armed with four plicæ and a slight callus at the upper extremity.

Length 12 millims., diam  $4\frac{1}{2}$ ; length of aperture  $5\frac{1}{2}$ .

*Hab.* Station 7.

This species is allied to *M. analogica*, Reeve, but differs in the length of the spire and aperture, width and position of the yellow zones, and the continuation of the ribs upon the body-whorl.

## 85. MITRA (PUSIA) INERMIS, Reeve. (Plate XX. figs. 53, 53a.)

*Mitra (Pusia) inermis*, Reeve, Con. Icon. ii. sp. 279; Sowerby's Thes. Conch. fig. 600 (vile!).

*Hab.* Station 5. Island of Luzon (*Cunning*).

A single specimen (fig. 53a), which I consider a variety of this species, differs from the type (fig. 53) in being nearly black, with the white zone less well defined, but marked in the same manner with short black and brown lines upon the ribs. Reeve does not mention the sculpture between the costæ: it consists of well impressed lines or sulci, six in number on the upper whorls and eleven or twelve on the last, besides some strong oblique grooves at the extreme base; the liræ between the latter, of which one is especially prominent, are spotted with white. The figure in the Con. Icon. represents the spire much too turreted and the whorls too flat. The copy of Reeve's figure in Sowerby's Thesaurus is simply as bad as possible.

## 86. CANCELLARIA JAPONICA. (Plate XX. fig. 54.)

Shell ovate, pyramidal, white, thickish: whorls 7, convex, divided by a deep suture, longitudinally ribbed and spirally lirate; costæ rounded, oblique, about 13 on a whorl, rather broader than the interstices; transverse liræ prominent, six or seven on the penultimate whorl and twelve on the last: aperture small, occupying about three eighths of the entire length; columella with two small central oblique plaits.

Length 12 millims., diam. 5.

*Hab.* Station 1.

This species is remarkable on account of its elongated form and the absence of colour. The only specimen is not in very good condition, and the liræ, which are usually met with in the aperture of species of *Cancellaria*, are not present, and possibly have been broken away with the front part of the labrum, which is incomplete.

## 87. OLIVA (OLIVELLA) CONSOBRINA, Lischke.

*Oliva (Olivella) consobrina*, Lischke, Japon. Meer.-Conch. ii. p. 62, pl. 5. f. 10, 11.

? *O. fortunei*, A. Adams, MS.; Marratt in Sowerb. Thesaurus, f. 422, 423.

? *O. fulgurata*, Ad. and Rve. Voy. Samarang, p. 31, pl. 10. f. 12.

*Hab.* Stations 7 and 22. Nagasaki (*Lischke*).

These three species are very closely related; and it is somewhat doubtful if they are really distinct. If they prove to be so, the name *fulgurata* will take precedence of the other two by many years. This species was quoted by me in the 'Annals and Magazine of Natural History' under the name of *O. fulgurata*.

## 88. OLIVA (OLIVELLA) SPRETA, Gould. (Plate XX. fig. 55.)

*Olivella spreta*, Gould, Otia, p. 127.

Shell small, elongate-ovate, pale livid luteous, with light brown indistinct zigzag undulating longitudinal lines: whorls  $4\frac{1}{2}$ -5, the

upper ones with straight or even faintly concave outlines, pale at the upper margin, and of a uniform yellowish brown on the rest of the surface; suture deeply channelled; last whorl large, longitudinally streaked with very fine and close white lines (only visible under a lens); columella covered with a thin pellucid callus, with three or four oblique plicæ at the base; basal callous band pale luteous, white at the upper edge, with a brown line just beneath, and bordered inferiorly by the uppermost of the basal oblique plicæ, which is also brown; edge of the canal brown.

Length  $6\frac{1}{2}$  millims., diam. 3; aperture 4 long.

*Hab.* Station 14.

The markings of these little shells, of which there are five, are rather indistinct to the naked eye. The longitudinal pale-brown lines are undulating, or partake of a zigzag disposition. They agree very well with Gould's brief description, and most likely are rightly assigned to his species, of which the Museum already possessed a single colourless example determined by Dr. P. P. Carpenter.

#### 89. ANCILLARIA INORNATA. (Plate XX. fig. 56.)

Shell elongate, acuminate ovate, white, faintly tinged with yellow above the sutural line: whorls 4, coated with a thin enamel; spire moderately acute at the apex, with slightly convex outlines; last whorl indistinctly transversely striated with two narrow oblique sulci on the lower part, whereof the upper is the deeper and borders the basal balteus; the extremity of the whorl deeply sulcated, with three or four oblique plicæ between the sulcations. Aperture occupying rather more than half the whole length; basal notch broad, shallow.

Length 8 millims, diam. 3.

*Hab.* Japan.

#### EXPLANATION OF PLATES XIX. & XX.

Fig. 1, 1a. *Terebra gotocensis*, p. 183.

2. *Terebra jeffreysii*, p. 184.

3. — *subcætilis*, p. 185.

4. — *tantilla*, p. 185.

5. — *albozonata*, p. 185.

6, 6a. *Pleurotoma vertebrata*, p. 186.

7. — *niponica*, p. 187.

8. — *difficilis*, p. 187.

9. — *triporeata*, p. 188.

10. — *patruelis*, p. 188.

11. — *consmilis*, p. 188.

12. *Drillia peradmirabilis*, p. 189.

13. — *nagasakiensis*, p. 190.

14. — *longispira*, p. 190.

15. — *japonica*, p. 191.

16. — *subobliquata*, p. 191.

17. — *candens*, p. 192.

18. — *ravicostata*, p. 192.

19. — *intermaculata*, p. 193.

20. — *humilis*, p. 193.

21. — *flavonodulosa*, p. 194.

22. — *fortilirata*, p. 194.

23. — *subauriformis*, p. 195.

Fig. 24. *Drillia gracilentia*, p. 195.

25. *Defrancia gracilispira*, p. 196.

26. *Daphnella*? *fuscolutea*, p. 196.

27. — ? *subzonata*, p. 197.

28. *Mangilia robusticostata*, p. 198.

29. *Lachesis japonica*, p. 198.

30. *Murex solrinus*, p. 199.

31. *Murex* (*Ocenebra*) *fimbriatus*, p. 201.

32. *Trosalpinx innotabilis*, p. 201.

33. *Fusus nigrirostratus*, p. 202.

34. — *niponicus*, p. 203.

35. — *simplex*, p. 204.

36. — *coreanicus*, p. 204.

37, 37a. — *pachyrhaphis*, p. 205.

38. *Siphonalia spadicea*, p. 205.

39, 39a. *Euthria ferrea*, p. 206.

40. *Tritonidea subvirginosa*, p. 206.

41. *Columbella* (*Atilia*) *lischkei*, p. 207.

Fig. 42. *Columbella (Atilia) niveomarginata*, p. 208.

43. — (*Zafra*) *subvitreata*, p. 209.

44-44b. — (*Amycla*) *varians*, p. 210.

45, 45a. *Nassa (Zeuaxis) siquijorensis*, p. 210.

46. — (*Hima*) *acutidendata*, p. 212.

47. — (—) *luteola*, p. 212.

48. *Coralliophila jeffreysii*, p. 213.

Fig. 49. *Mitra (Costellaria) fuscoapicata*, p. 214.

50. — (—) *collinsoni*, p. 215.

51. — (—) *gotoensis*, p. 215.

52. — (*Pusia*) *emula*, p. 215.

53, 53a. — (—) *incermis*, p. 216.

54. *Cancellaria japonica*, p. 216.

55. *Oliva (Olivella) spreata*, p. 216.

56. *Ancillaria inornata*, p. 217.

March 4, 1879.

Prof. W. H. Flower, F.R.S., President, in the Chair.

The Secretary made the following report on the additions to the Society's Menagerie during February 1879 :—

The total number of registered additions to the Society's Menagerie during the month of February was 47, of which 3 were by birth, 20 by presentation, 18 by purchase, 4 were received in exchange, and 2 on deposit. The total number of departures during the same period, by death and removals, was 83.

The most noticeable additions during the month were :—

1. A Purple-crested Touracou (*Corythaix porphyreolopha*), presented by the Rev. J. A. Gould, F.Z.S., February 4.

On his return from Natal Mr. Gould was kind enough to bring us the first example of this beautiful Touracou which has been received alive by the Society. The bird was obtained from a person on board the Zanzibar mail-steamer, and is doubtless from Mozambique, or from some part of the East-African coast.

2. A very beautiful Iguanoid Lizard (kindly determined by Dr. Günther as *Crotophytus wislezani*, Baird and Girard) from New Mexico, presented by Lieut.-Col. Ralph Vivian, F.Z.S., on the 18th February, which has unfortunately died since its receipt by the Society.

Mr. Selater laid before the Meeting examples of two rare Fruit-Pigeons (*Carpophaga van-wicki*, Cassin, and *C. rhodinolæma*, ScL.), and pointed out, in reference to some recent remarks by Dr. Fusch on these birds (*antea*, p. 13), that though nearly allied, they were by no means conspecific, *C. rhodinolæma* being altogether smaller in size, and having a dark-green back.

Mr. Selater had no doubt that the bird obtained by Mr. Hübner in the Duke-of-York group would turn out to be *C. vanwycki*, not *C. rhodinolæma*.

Mr. L. M. D'Albertis, C.M.Z.S., exhibited some new and rare birds from his recent expedition up the Fly River, New Guinea, amongst which were a series of Paradise-birds, apparently intermediate between *Paradisæa apoda* and *P. raggiana*, and examples of *Cyclopsittacus cervicalis*, *Megacrex inepta*, *Cinclosoma ajar*, and other little-known species.

Prof. Newton, M.A., F.R.S., Vice-President, exhibited (on behalf of Mr. John Robinson, of Trinity Hall, Cambridge) a specimen of *Sylvia nisoria*, remarking:—

“This specimen was formerly the property of Mr. Germany, for many years the highly-respected porter of Queens’ College, who in the course of a long life formed a considerable collection of birds, nearly all obtained by himself in and near Cambridge, and also stuffed by himself. At his death, more than twenty years ago, it passed, with many others of his specimens, into the possession of an old friend of his, Mr. Elijah Tarrant, of whom Mr. John Robinson, an undergraduate of Trinity Hall, bought it about a twelvemonth since. Up to this time no one seems to have known what the bird was, though some ingenious person had hazarded the suggestion that it was a variety of the Nightingale. Soon after, it was seen by Mr. Frederick Bond, F.Z.S., who at once recognized it as *Sylvia nisoria*, and was good enough to advise its being shown to me. It was accordingly brought to me by Mr. Doggett, a bird-stuffer at Cambridge, in whose hands Mr. Robinson had placed it for remounting; and I immediately made all the inquiries I could about it. It appears that it was shot by Germany, a long time before his death, in a garden at a place known as “Paradise,” not far from Queens’ College. Tarrant tells me that he remembers seeing it directly after it was mounted, if not before the skin was taken off, and that Germany said he had much difficulty in shooting it, owing to the thick foliage in which the bird kept, being obliged at last to fire when it was so close to him that it was greatly damaged by the shot. Any one who examines the specimen will see that its condition corroborates this last statement, as it has lost a considerable number of feathers from the head, especially near the gape, and several rectrices are wanting. But I see no reason for doubting any particular of the story as told to me. I have satisfied myself that on the part of no one has there been an attempt to make money out of it; and in further confirmation thereof I would call attention to the glass eye which has been inserted into the specimen. This has the iris of a pale yellow, which we know to be the colour in *Sylvia nisoria*, but a colour so uncommon in species of the family that an English bird-stuffer would hardly have thought of using it had he not been prompted by finding an iris of this colour in the bird when fresh. I may add that the specimen, from its plumage, seems to have been a male; and, so far as Tarrant recollects, it was shot in spring or early summer; but as its death took place possibly forty years ago, he cannot be at all certain on this point.”

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The following papers were read:—

1. Liste des Oiseaux recueillis au Nord du Pérou par MM. Stolzmann et Jelski en 1878. Par M. L. TACZANOWSKI.

[Received February 8, 1879.]

(Plates XXI. & XXII.)

Les oiseaux compris dans cette liste sont recueillis dans plusieurs localités, peu éloignées entre elles, mais très-différentes sous le rapport des conditions naturelles ; chacune de ces localités est indiquée sous les espèces. Principalement ils ont été collectionnés à :—

*Pacasmayo*, port du département Libertad, province San Pedro. Aux environs il y a des dunes sablonneuses, parsemées de rares buissons isolés, très-touffus. La vallée abonde en juncs, dans lesquels séjournent le *Cyanotis azarae*, les ralles et les butorides, etc. En avançant dans la vallée on entre dans les Algarrobes, habités par les *Phyllomyias tumbezana*, *Myiarchus semirufus*, etc.

*Chota*, 8000' d'altitude au dessus du niveau de la mer. Département de Cajamarca, province Chota. Aux environs se trouvent principalement des terrains cultivés, et des broussailles dans les vallées.

*Montaña de Chuli*, à deux leguas de Chota, sur la route de Tacabamba, 9000' d'altitude.

*Tambillo*, 6° de lat. sud, 5800' d'altitude. Département Cajamarca, province Jaen, district Cujillo. (Le district est indiqué, car plusieurs localités dans cette province portent le même nom, et sont tout-à-fait différentes sous le rapport de la faune et de la flore.) Quoique cette localité est située dans la hauteur indiquée plus haut, M. Stolzmann a poussée ses excursions jusqu'à 8000' d'altitude. La forêt de cette localité est serrane proprement dite. En bas elle se caractérise par l'abondance d'un petit palmier nommé *sada*, qui est remplacé plus haut par des fougères arborescentes.

*Montaña de Palto*, à une legua de Tambillo, sur la route de Pimpingos. Les oiseaux de cette localité ont été recueillis sur la hauteur de 7000 jusqu'à 7500'. Cette forêt est la continuation de celle de Tambillo et présente le même caractère.

*Gujángo*, dans la vallée du Marañon, à peu près à la même latitude que Tambillo, élevée au dessus du niveau de la mer selon l'ingénieur Werthemann de 800', et selon l'anéroïde de M. Stolzmann 1500'. La vallée est aride et très-chaude. La flore porte en grande partie le caractère de celle du littoral, elle est caractérisée par les genres *Cactus*, *Prosopis*, *Capparis*, etc. Gujángo est une colonie, composée de 10 cabanes (département Cajamarca, province Jaen, district Choros). M. Stolzmann a visité seul cette dernière localité.

Chaque espèce de cette liste qui n'a pas été comprise dans nos listes précédentes est marquée d'un astérique devant son numéro ; 56 espèces sont donc nouvelles pour l'exploration de nos voyageurs, et ne se trouvent pas dans leurs listes précédentes<sup>1</sup>, et plusieurs d'entre elles sont nouvelles pour la faune péruvienne.

<sup>1</sup> Voyez P. Z. S. 1877, pp. 310, 744.



## Family TURDIDÆ.

1. *TURDUS SWAINSONI*, Cab. ; Tacz. P. Z. S. 1874, p. 503.

Une paire de Tambillo les 2 et 14 janvier 1878. Iris brun foncé.

\*2. *TURDUS* sp. ?

Un jeune oiseau tué à Tambillo le 22 juin 1878. Cette grive a été très-commune dans la vallée du Marañon, mais les oiseaux ont été en pleine mue et mauvais pour la collection.

3. *TURDUS SERRANUS*, Tsch. ; Scl. P. Z. S. 1870, p. 780 ; Tacz. P. Z. S. 1874, p. 504, n. 7.

Une femelle tuée à Tambillo le 9 février 1878, et un jeune oiseau le 15 septembre 1877.

Iris de la femelle est brun grisâtre foncé.

Le jeune a les parties supérieures du corps brunes-olivâtres, d'une nuance comme celle de la femelle ; le fond de la gorge, de la poitrine, et du ventre d'un roux grisâtre sale, ondulé de brunâtre.

4. *TURDUS LEUCOPS*, Tacz. P. Z. S. 1877, p. 331.

Deux mâles et une femelle recueillis à Tambillo le 8 janvier et le 12 février 1878, ainsi que deux jeunes dans leur premier plumage pris dans la même localité le 22 novembre 1877, et à Ambagay le 16 mars 1878.

Les deux mâles s'accordent parfaitement dans tous leurs détails avec le mâle de Ropaybamba, qui m'a servi à la description citée, ils présentent les mêmes dimensions, la même couleur noire profonde avec un éclat bleuâtre également prononcé, la même forme de la queue, et l'iris blanc selon l'indication de M. Stolzmann. On trouve cependant des petites différences dans la proportion des rémiges primaires : un de ces mâles a la 4<sup>e</sup> rémige la plus longue, mais dépassant très peu la 3<sup>e</sup>, la 2<sup>e</sup> est un peu plus longue que la 6<sup>e</sup>.

Dans la femelle la 1<sup>re</sup> rémige dépasse un peu les grandes couvertures, mais beaucoup moins que dans l'espèce précédente ; la différence entre les 3<sup>e</sup>, 4<sup>e</sup>, et 5<sup>e</sup> très petite. La taille, le bec, les pattes et la queue sont comme dans le mâle. La couleur générale des parties supérieures du corps est comme dans la femelle du *T. serranus*, mais un peu plus claire, avec un lustre soyeux distinctement plus fort ; celle du dessous est plus claire, surtout sur le milieu de la poitrine et du ventre, où elle est fauve blanchâtre sale ; les subcaudales sont fauves, les subalaires rousses. Le bec est noir ; les pattes cornées ; l'iris selon l'indication de M. Stolzmann gris-jaunâtre.

Les jeunes dans leur premier plumage sont tout-à-fait différents des jeunes de l'espèce précédente. Toutes les parties supérieures du corps, les ailes et la queue sont d'un noir mate ; une tache triangulaire rousse se trouve sur l'extrémité de chaque tectrice alaire, le dessous du corps est d'un roux vif, rayé transversalement de stries noirâtres fines, qui se trouvent sur l'extrémité de toutes les plumes ; les côtés du ventre noirâtres ; les subalaires rousses tachetées de

noirâtre; le front roussâtre; le dessus de la tête varié de stries roussâtres, très-fines. Le bec noirâtre avec l'extrémité même de la mandibule supérieure jaunâtre. L'autre exemplaire plus jeune que le précédent, à queue longue d'un pouce, a la rayure foncée des parties inférieures plus dense.

5. CATHARUS FUSCATER (Lafr.); Tacz. P. Z. S. 1874, p. 504.

Une paire (♂ et ♀) de Tambillo le 11 décembre 1877 et le 8 février 1878. Iris blanc sale dans le mâle, et blanc dans la femelle.

Deux œufs trouvés à Tambillo le 2 janvier 1878 sont de forme ovée, peu allongée, à sommet sensiblement plus gros que la base, les deux extrémités obtuses. Le mode de la coloration est comme dans les autres grives: le fond est d'une couleur vert-bleuâtre pâle, varié de nombreuses taches irrégulières d'un gris violâtre pâle, et d'autres superficielles brunes. La surface est assez polie. Dimensions:  $24 \times 18.5$ ;  $27.5 \times 19$  mill.

Family TROGLODYTIDÆ.

\*1. THRYOTHORUS SCLATERI, n. sp.

*Supra griseo-rufus, pileo vix rufescentiore; subtus albo nigroque undulatus; genis et lateribus colli albo nigroque variis; superciliis albis nigro maculatis; cauda griseo nigroque transfasciata, fasciis rectricum externarum albis. Rostrum corneum; pedes grisei; iris fusco-brunnea.*

Forme voisine du *Th. maculipectus*, Lafr., mais parfaitement distincte. Le bec est beaucoup plus long et plus fort, d'une couleur cornée, moins foncée; les pattes plus robustes et un peu plus longues, grises pâles. La couleur du dessus de la tête est roussâtre, beaucoup plus pâle que dans l'espèce citée, passant indistinctement au gris roussâtre des parties supérieures du corps. Tout le dessous est blanc, largement ondulé de noirâtre d'une manière irrégulière, à raies foncées presque aussi larges que les blanches; les côtés du ventre légèrement teints de gris roussâtre. Les côtés de la tête variés de noir et de blanc; sur les côtés du cou se trouve un espace noir parsemé de taches blanches; la bande sourcilière est blanche variée de noir. Les rémiges brunes largement bordées de la nuance analogue à celle du dos et légèrement ondulées de plus foncé. Les rectrices médianes rayées transversalement de noir et de gris cendré; les raies claires des externes sont blanches, et des suivantes passant graduellement en gris cendré. Subcaudales blanches rayées de noirâtre; subalaires blanchâtres, indistinctement variées de foncé. Iris brun-foncé.

En coloration cette espèce se distingue principalement du *Th. maculipectus* par la couleur du dessus de la tête non tranchée de celle du dos, mais se confondant graduellement; par la maculature des parties inférieures presque égale depuis le bec jusqu'aux subcaudales, sans un espace blanc pur au milieu du devant de la gorge, propre à l'espèce citée; par la bande sourcilière tachetée et non distinguée des parties voisines par une large raie foncée postoculaire, comme

cela a lieu dans le *T. maculipectus* ; par la présence de l'espace noir maculé de blanc sur les côtés du cou ; par la couleur de la queue et du bas ventre ; les taches de la poitrine sont autres ; moins nombreuses, plus grosses, plus uniformes et moins foncées ; la jambe est revêtue jusqu'au talon de plumes blanches très-rayées transversalement de brun, tandis que dans le *T. maculipectus* cette partie est unicolor analogue à la couleur des côtés du ventre.

♂. Longueur de l'aile 68 mill., queue 61, bec dep. la commis. 24, tarse 21. ♀. Longueur de l'aile 63 mill., queue 58, bec dep. la commis. 23, tarse 22.

Une paire de Guajango, tuée le 18 et le 25 avril 1878.

2. *HENICORHINA LEUCOPHRYS* (Tsch.) ; Tacz. P. Z. S. 1874, p. 504.

Une paire de Tambillo le 14 janvier 1878. Iris brun foncé.

#### Family SYLVIIDÆ.

\*1. *POLIOPTILA BUFFONI*, Scl.

Un mâle de Guajango, tué le 24 avril 1878. Iris brun foncé.

2. *POLIOPTILA ALBILORIS*, Salv. ; Tacz. P. Z. S. 1877, p. 319.

Un mâle et deux femelles, tués à Pacasmayo dans la moitié de juin 1877.

#### Family MNIOTILTIDÆ.

1. *PARULA PITIAYUMI* (Vieill.) ; Tacz. P. Z. S. 1877, p. 319.

Une femelle de Tambillo le 15 novembre 1877.

2. *DENDRÆCA BLACKBURNIÆ* (Gm.) ; Tacz. P. Z. S. 1874, p. 508.

Plusieurs exemplaires de Tambillo, recueillis depuis de 19 novembre 1877, jusqu'au 25 mars 1878.

3. *DENDRÆCA CANADENSIS* (L.) ; Tacz. P. Z. S. 1874, p. 508.

Une paire de Tambillo, tuée le 27 novembre 1877 et le 28 mars 1878.

\*4. *BASILEUTERUS CASTANEICEPS*, Scl. et Salv. P. Z. S. 1877, p. 521.

Sept exemplaires de Tambillo, recueillis depuis la moitié de novembre 1877, jusqu'à la moitié de janvier 1878. Iris brun foncé.

\*5. *BASILEUTERUS NIGRICRISTATUS* (Lafr.).

Un mâle tué le 3 juillet 1877 à Schuccha près de Cutervo, à 7700' d'altitude. Iris brun foncé.

6. *SETOPHAGA VERTICALIS*, Lafr. et Orb. ; Tacz. P. Z. S. 1874, p. 508.

Sept exemplaires de Tambillo, tués en novembre et décembre 1877. Iris brun foncé.

\*7. *SETOPHAGA BAIRDI*, Salv. Ibis, 1878, p. 317, pl. viii. fig. 1.

Deux mâles tués à Cuota, 8000' d'altitude, le 3 et 15 août 1877. Iris brun foncé.

#### Family VIREONIDÆ.

1. *VIREOSYLVA JOSEPHÆ*, Sel. : Tacz. P. Z. S. 1874, p. 509.

Cinq exemplaires recueillis à Tambillo en octobre et novembre 1877 et en mars 1878. Iris brun foncé.

\*2. *VIREOSYLVA OLIVACEA* (L.).

Trois exemplaires de Guajango pris le 21 et le 27 avril 1878. Iris brun rougeâtre.

\*3. *CYCLORHIS CONTRERASI*, n. sp. (Plate XXI.)

*C. virenticipiti simillimus, sed pileo toto ferrugineo, dorso obscuriore, colore flavo collari minus extenso.*

Cet oiseau est très-voisin du *C. virenticeps*, Sel., il en diffère cependant par le dessus de la tête qui est ferrugineux-foncé en entier et coloré un peu de verdâtre au milieu même. La couleur verte des parties supérieures du corps est distinctement plus foncée que dans l'espèce citée, et le jaune du devant de la gorge moins étendu; les joues sont verdâtres, ainsi que les côtés du cou et de la poitrine. Le reste des parties inférieures du corps, les ailes et la queue, sont comme dans le *C. virenticeps*. Le bec est un peu plus long et plus comprimé dans sa partie antérieure; la mandibule supérieure rougeâtre, l'inférieure plombée à extrémité blanchâtre; les pattes carnées; iris orangé.

♂. Long. tota 180 mill., envergure 258, aile 77, queue 65, bec 20, tarse 24. ♀. Long. tota 180 mill., envergure 258, aile 77, queue 68, bec 21, tarse 23.

Une paire tuée à Tambillo le 23 novembre et le 4 décembre 1877.

Je suis heureux de pouvoir dédier cette nouvelle espèce à Don Gregorio Contreras de Cutervo, comme témoignage de ma reconnaissance à l'égard du bon accueil fait à nos voyageurs, ce qui a contribué en grande partie aux succès qu'ils ont remporté dans cette intéressante contrée.

#### Family HIRUNDINIDÆ.

*ATTICORA CYANOLEUCA* (V.); Tacz. P. Z. S. 1874, p. 510.

Un mâle adulte de Tambillo tué le 23 novembre 1877, et un jeune de Pacasmayo du 14 juin 1877. Iris brun foncé.

#### Family CÆREBIDÆ.

\*1. *DIGLOSSA ATERRIMA*, Lafr.

Un mâle tué à Tambillo le 17 novembre 1877. Iris brun foncé.

\*2. *DIGLOSSA ALBILATERALIS*, Lafr.

Quatre mâles et une femelle pris à Tambillo depuis le 13 novembre 1877, jusqu'au 6 mai 1878. Iris brun foncé.

3. *DIGLOSSA BRUNNEIVENTRIS*, Des Murs; Tacz. P. Z. S. 1874, p. 511.

Un mâle adulte et un jeune pris le 1 août 1877 à Chota, 8000' d'altitude. Iris brun foncé.

4. *DIGLOSSOPIS CÆRULESCENS*, Schl., Tacz. P. Z. S. 1874, p. 511.

Un mâle pris dans la montaña de Palto 7500' d'altitude, le 26 décembre 1877, et une femelle de Tambillo tuée le 31 décembre. Iris rouge brunâtre.

5. *CONIROSTRUM CINEREUM* (Lafr. et Orb.); Tacz. P. Z. S. 1874, p. 511.

Un jeune mâle de Pacasmayo le 12 juin 1877. Iris brun foncé.

6. *CONIROSTRUM ATROCYANEUM*, Lafr.; Tacz. P. Z. S. 1874, p. 511.

Une paire de Tambillo du 17 septembre 1877 et du 2 janvier 1878. Un mâle de la montaña de Palto 7400', tué le 26 décembre 1877. Iris brun foncé.

Les deux mâles adultes ont comme ceux de Chilpes et de Puma-marca la calotte bleue. Dans la femelle le bleu du dessus de la tête est beaucoup plus clair que celui du mâle, passant au cendré foncé à la nuque; le dos est d'un vert plus vif que celui du jeune mâle; le croupion jaune verdâtre; la gorge, les côtés du visage et la poitrine cendrés; le ventre jaune verdâtre; remiges et rectrices noirâtres; bordées largement de vert; les petites couvertures alaires d'un vert beaucoup plus pur que celui du dos.

7. *CERTHIOLA PERUVIANA*, Cab.; Tacz. P. Z. S. 1874, p. 512.

Trois exemplaires de Pacasmayo, tués en juin 1877. Iris brun foncé.

- \*8. *CERTHIOLA* sp. ?

Trois mâles pris à Guajango en avril 1878. Iris brun foncé.

Ces oiseaux de Guajango diffèrent des oiseaux de Pacasmayo et de Paltaypampa par la taille plus forte (l'aile a 64 mm. de longueur, tandis que ceux de la côte ont seulement 55), mais il s'en distinguent le plus par une grande différence dans la longueur du bec, qui est long de 19 mm. depuis la commissure, tandis qu'il est de 14 mm. dans la *C. peruviana*. La coloration est la même dans les deux; le miroir alaire blanc également développé, seulement la couleur du dos présente une légère nuance verdâtre dans les oiseaux de Guajango.

#### Family TANAGRIDÆ.

- \*1. *CHLOROPHONIA VIRIDIS* (V.).

Une femelle tuée dans la montaña de Palto le 10 décembre 1877.

2. *EUPHONIA NIGRICOLLIS*, V., Tacz. P. Z. S. 1874, p. 518.

Trois mâles et une femelle recueillis à Tambillo dans les premiers jours de juin 1878. Iris brun foncé.

\*3. *EUPHONIA MINUTA*, Cab.?

Une femelle tuée à Tambillo le 25 juin 1878.

\*4. *PIPRIDEA MELANONOTA* (V.).

Une paire tuée à Tambillo le 25 décembre 1877 et le 26 juin 1878.

M. Stolzmann a trouvé que la poche stomacale dans cet oiseau est rudimentaire, à peine distincte, et en conséquence il est de l'opinion que les *Pipridea* doivent être rangées tout près des *Euphonia*, aux quelles elles ressemblent beaucoup par leurs habitudes.

\*5. *DIVA VASSORI* (Boiss.).

Nombreux exemplaires des deux sexes et en différents plumages, recueillis à Tambillo entre le 9 septembre 1877 et le 18 mars 1878 ; les jeunes commencent à prendre le plumage parfait en décembre et en janvier. Iris brun foncé.

6. *CALLISTE NIGRIVIRIDIS* (Laf.); Tacz. P. Z. S. 1874, p. 514.

Sept exemplaires pris à Tambillo entre le 9 septembre 1877 et le 21 juin 1878. Iris brun foncé.

Tous ces oiseaux, ainsi que celui d'Anquimarea comparés avec un exemplaire de Bogota, se trouvant au Musée de Varsovie, présentent une différence remarquable dans la nuance des taches vertes. En général toutes les taches des individus péruviens se distinguent par le manque de la nuance bleue, qui est à peine distincte sur le devant de la gorge ; sur les petites couvertures alaires, les bordures des rémiges et des rectrices la nuance bleue est beaucoup plus faible ; tandis que dans l'oiseau de Bogota les taches du devant de la gorge et des petites couvertures alaires sont d'une belle couleur bleue pure, sans nuance verte ; le bleu des bordures des rémiges et des rectrices est beaucoup plus fort, et toutes les taches des autres parties du corps sont imprégnées d'une nuance bleue. En général les taches sont plus grandes dans les oiseaux péruviens. M. le comte de Berlepsch a trouvé la même différence en comparant un exemplaire de Tambillo avec les oiseaux de la Nouvelle Grenade et de Venezuela dans sa collection.

7. *CALLISTE ARGENTEA* (Tsch.); Tacz. P. Z. S. 1874, p. 514.

Nombreux exemplaires des deux sexes recueillis entre le 2 septembre 1877 et le 18 mars 1878. Mr. Stolzmann a marqué dans tous ces exemplaires, ainsi que M. Jelski dans celui de Paltaypampa l'iris brun foncé ; Tschudi dit jaunâtre.

La femelle a le dessus de la tête d'un brun grisâtre foncé, dont toutes les plumes sont terminées d'une large bordure jaunâtre, en formant des nombreuses squammules bien distinctes ; le dos est d'une belle couleur verte, prenant dans certaines directions de la lumière un éclat doré assez fort, analogue à celui du mâle ; la gorge et les côtés du visage sont de la même nuance jaune ocreuse comme dans le mâle ; la poitrine est grise olivâtre, enduite plus ou moins de jaune verdâtre ; le milieu du ventre est cendré grisâtre, les côtés verts ; les subcaudales grises verdâtres au milieu, largement bordées

de blanc verdâtre. Les ailes et la queue sont noirâtres, avec toutes les plumes largement bordées de vert; les bordures des remiges primaires sont fines et n'atteignent pas l'extrémité des plumes; dans quelques-unes, certainement adultes, ces bordures sont plus ou moins bleuâtres; la page inférieure de la queue est bleuâtre pale. Le bec est d'un noir un peu moins foncé que celui du mâle; les pattes brunes noirâtres.

Les jeunes des deux sexes ressemblent à la femelle; après la première mue les mâles prennent leur habit.

8. *CALLISTE XANTHOCEPHALA* (Tsch.); Tacz. P. Z. S. 1874, p. 514.

Deux mâles de Tambillo du 10 janvier et du 5 juin 1878. Iris brun foncé.

9. *TANAGRA COELESTIS*, Spix; Tacz. P. Z. S. 1874, p. 513.

Une femelle de Tambillo du 7 décembre 1877. Iris brun foncé.

10. *TANAGRA CYANOCEPHALA*, Lafr. et Orb.; Tacz. P. Z. S. 1874, p. 513.

Une femelle de Tambillo tuée le 15 novembre 1877. Iris brun foncé.

11. *PÆCILOTHRAUPIS LACRYMOSA* (Dubus); Tacz. P. Z. S. 1874, p. 514.

Un mâle tué à Tambillo le 8 février 1878. Iris brun foncé.

12. *PYRANGA AZARÆ* (Lafr. et Orb.); Tacz. P. Z. S. 1874, p. 514.

Trois mâles et une femelle de Tambillo tués entre le 1 octobre 1877 et le 20 mars 1878. Iris brun foncé.

Ces oiseaux de Tambillo comparés avec le mâle adulte de Junin présentent des différences assez importantes; le rouge des parties supérieures du corps est distinctement plus clair dans les premiers; la différence de la nuance des parties inférieures est encore plus frappante, elle est beaucoup plus claire, et d'une nuance miniacée, tandis que dans l'oiseau de Junin elle est plus foncée et tirant sur le cinabre; le tour de l'œil est miniacé dans les exemplaires de Tambillo et rose dans celui de Junin. Le bec dans tous les individus de Tambillo est un peu plus long, distinctement plus comprimé dans sa partie antérieure, à arête plus prononcée dans toute sa longueur. Les dimensions sont presque les mêmes.

\*13. *PYRANGA ÆSTIVA* (Gm.).

Un mâle et une femelle tués à Tambillo le 15 novembre 1877 et le 18 janvier 1878, parfaitement identiques avec les oiseaux de l'Amérique septentrionale. Iris brun foncé.

14. *NEMOSIA ORNATA*, Scf.; Tacz. P. Z. S. 1874, p. 515.

Un exemplaire à sexe inconnu tué à Tambillo le 25 septembre 1877.

## \*15. NEMOSIA INORNATA, n. sp.

Mas capite supra nuchaque rufo-castaneis, dorso griseo; subtus fulvus, alis caudaque fusco-griseis, griseo limbatis. Rostrum corneum; pedes fusci; iris fusco brunnea.

Fœm. mari similis, pileo nuchaque vix rufescenti lavatis, superciliis et regione postoculari rufescentibus.

Espèce voisine de la *N. ornata*, Scl. Le mâle a le dessus de la tête, la nuque, et la partie postoculaire des côtés de la tête d'une vive couleur rousse cannelle; le dos gris foncé; toutes les parties inférieures ainsi que le devant du visage fauves, plus pâles le long du milieu de l'abdomen. Les ailes sont grises foncées, les rémiges primaires finement bordées de grisâtre clair, les bordures des secondaires légèrement verdâtres; le bord interne de toutes les rémiges largement blanchâtre; les couvertures alaires cendrées foncées, les subalaires fauves. Les rectrices sont de la couleur des rémiges, et également bordées de gris. Le bec est corné; pattes grises foncées; l'iris brun foncé.

La femelle ressemble au mâle et n'en diffère que par la couleur du dessus de la tête et de la nuque, qui est à peu près comme celle du dos, mais légèrement teinte d'une nuance roussâtre; un large sourcil commençant à la naissance du bec et fort élargi sur la partie postoculaire roussâtre, se confondant graduellement avec la couleur des parties environnantes.

Un jeune mâle commençant à prendre son habit d'adulte ressemble à la femelle, mais la bande sourcilière est beaucoup plus claire, et la partie postérieure du visage beaucoup plus pâle; il n'a point de nuance verdâtre sur les bordures des rémiges secondaires; sur la calotte il a déjà un grand nombre de plumes rousses, mélangées avec les plumes de l'habit précédent.

Le plumage frais des adultes a une nuance olive sur les parties supérieures du corps, et le fauve roussâtre des parties inférieures est plus intense, surtout sur les côtés du corps.

♂. Long. tot. 158, envergure 212, aile 68, queue 62, bec 15, tarse 19 mm. ♀. Long. tot. 147, envergure 194, aile 62, queue 56, bec 13, tarse 19 mm.

16. BUARREMON BRUNNEINUCHUS (Lafr. et Orb.); Tacz. P. Z. S. 1874, p. 515.

Plusieurs exemplaires recueillis à Tambillo entre le 13 novembre 1877 et le 16 janvier 1878. Iris brun foncé.

## \*17. BUARREMON SPECULARIS, Salvin, MS.

Deux mâles, une femelle, et un albino recueillis à Tambillo entre le 2 septembre 1877 et le 22 mars 1878, ainsi qu'un mâle de la montaña de Palto à 7500' d'altitude, tué le 26 décembre 1877. Iris brun rougeâtre.

Très-voisin du *B. latinuchus*, Scl., mais différent dans plusieurs détails: la couleur du dos est dans ce dernier schistacée foncée; il a une moustache foncée bien distincte sur les côtés de la gorge; l'aile



est plus longue (76 mm. dans le mâle et 74 dans la femelle, dans le *B. latinuchus* elle est de 71), le bec est un peu moins large.

\*18. *CHLOROSPINGUS CASTANEICOLLIS*, ScL.

Deux femelles tuées à Tambillo le 1 octobre 1877 et le 20 mars 1878. Iris brun foncé.

19. *CHLOROSPINGUS OLEAGINEUS*, ScL.; Tacz. P. Z. S. 1874, p. 517.

Trois exemplaires de Tambillo du 15 et le 22 septembre 1877. Iris brun foncé.

\*20. *CHLOROSPINGUS SUPERCILIARIS* (Lafr.).

Une femelle tuée à Tambillo le 27 décembre 1877. Iris brun foncé.

21. *SALTATOR ALBICOLLIS*, Vieill.?

Trois exemplaires (♀ ad. et deux jeunes) de Guajango, pris en avril 1878. Iris brun foncé.

Ces oiseaux me paraissent appartenir à une autre espèce. Ils sont plus petits. Le bec est moins élevé, un peu plus long, à dos moins arqué, noirâtre, avec l'extrémité jaune orangée et une pareille tache à la naissance de la mandibule supérieure. Le dessous du corps est fort tacheté de longues flammèches foncées, grosses sur la poitrine, moins larges sur le ventre et nulles au milieu même de ce dernier; la gorge est toute foncée avec une raie médiane blanchâtre. La femelle est bien adulte, à ailes et queue pâlies, et les rectrices médianes et quelques rémiges tertiaires fort usées. Longueur de l'aile de la femelle 91, bec depuis la commissure 20 mm.

Family FRINGILLIDÆ.

1. *PHEUCTICUS CHRYSOPEPLUS* (Vig.); Tacz. P. Z. S. 1874, p. 519.

Un mâle tué à Tambillo le 8 janvier 1878. Iris brun foncé.

2. *SPERMOPHILA GUTTURALIS* (Licht.); Tacz. P. Z. S. 1874, p. 519.

Plusieurs exemplaires recueillis à Tambillo en janvier 1878. Iris brun foncé.

3. *PHRYGILUS OCULARIS*, ScL.; Tacz. P. Z. S. 1874, p. 520.

Un exemplaire de Chota 8100' d'altitude, tué le 24 juillet 1878. Iris brun foncé.

4. *CATAMENIA INORNATA* (Lafr.); ScL. Nomencl. Av. Neotr. p. 31.

*Linaria inornata*, Lafr. Rev. Zool. 1847, p. 75.

*Catamenia rufirostris* (Landb.); Tacz. P. Z. S. 1874, p. 521. n. 21.

Une paire de Tambillo, tuée le 31 décembre 1877. Iris brun foncé.

5. *ZONOTRICHIA PILEATA* (Bodd.); Tacz. P. Z. S. 1874, p. 522.

Un mâle de Tambillo du 24 septembre 1877 et un jeune de Pacasmayo du 14 juin 1877.

6. *SYCALIS LUTEIVENTRIS* (Meyen); Tacz. P. Z. S. 1874, p. 522.

Une femelle de l'Arenal, tuée le 17 décembre 1877.

7. *CHRYSOMITRIS CAPITALIS*, Cab.; Tacz. P. Z. S. 1874, p. 523.

Une femelle de Tambillo, tuée le 1 octobre 1877. Iris brun foncé.

\*8. *CHRYSOMITRIS COLUMBIANUS* (Lafr.).

Plusieurs exemplaires des deux sexes recueillis à Tambillo depuis le 15 septembre jusqu'au 22 décembre 1877. Iris brun foncé.

\*9. *CORYPHOSPINGUS CRISTATUS* (Gm.).

Deux mâles adultes, une femelle, et un jeune recueillis à Guajango en avril 1878. Iris brun foncé.

#### Family ICTERIDÆ.

*CACICUS ALFREDI* (Desm.); Tacz. P. Z. S. 1874, p. 523.

Un mâle adulte et un jeune tués à Tambillo le 8 et le 18 janvier 1878. Iris de l'adulte brun foncé, et gris brunâtre dans le jeune.

#### Family CORVIDÆ.

*XANTHURA PERUVIANA* (Gm.); Tacz. P. Z. S. 1874, p. 524.

Une femelle de la montaña de Palto, et une seconde de l'Arenal, tuée le 17 décembre 1877. Iris jaune.

#### Family DENDROCOLAPTIDÆ.

1. *GEOSITTA PERUVIANA* (Lafr.); Tacz. P. Z. S. 1874, p. 524.

Une paire de Pacasmayo du 13 juin 1877. Iris brun foncé. Ces deux individus ont la couleur isabelle beaucoup plus claire que les individus des environs de Lima, recueillis en février.

2. *SYNALLAXIS FRONTALIS*, Pelz.; Tacz. P. Z. S. 1874, p. 527.

Un mâle tué à Pacasmayo le 12 juin 1877. Iris terre de Sienne.

\*3. *SYNALLAXIS ANTISIENSIS*, Schl.

Une paire (♂ et ♀) du 7 et du 14 décembre 1877, de Tambillo. Iris du mâle gris, de la femelle brun grisâtre.

\*4. *SYNALLAXIS MARANONICA*, n. sp.

*Capite et nucha brunnescenti-griseis, superciliis pallidioribus vix distinctis; dorso rufescenti-brunneo; subtus grisea, hypochondriis brunnescentibus; alis rufide cinnamomeis, cauda obscuriore. Rostris nigricantis mandibula inferior pallida; pedes fusci; iris fusco-brunnea.*

Voisine de la *S. cinerascens*, mais distincte par la couleur du dos.

dessus de la tête et la nuque sont d'une couleur grise brunâtre, à bande sourcilière grisâtre à peine distincte ; le dos et le croupion sont d'un roux brunâtre uniforme ; sur les parties inférieures du corps, ainsi que sur les côtés de la tête s'étend une couleur grise, légèrement blanchie au menton, et fort imprégnée de brunâtre sur les côtés du ventre ; le milieu du ventre est fauve. Les ailes sont d'un roux cannelle vif ; les rémiges brunes foncées largement bordées de roux, de sorte que l'aile pliée paraît être un peu plus foncée à l'extrémité que sur le devant ; les subalaires sont rousses claires ; la queue beaucoup plus foncée que l'aile. La mandibule supérieure est noirâtre, l'inférieure plus pâle ; les pattes carnées foncées ; iris brun foncé.

Long. de l'aile ♂ 61 mill., queue 72, bec dep. la commissure 19, tarse 21.

Deux mâles de Guajango du 20 et du 30 avril 1878.

5. *SYNALLAXIS STICTOTHORAX*, Sch. ; Tacz. P. Z. S. 1877, p. 323.

Un mâle tué à Pacasmayo le 12 juin 1877. Iris terre de Sienne.

\*6. *PLACELLODOMUS FRONTALIS* (Licht.).

Quatre exemplaires de Guajango recueillis au commencement d'avril 1878. Iris gris.

7. *ANABAZENOPS CABANISI*, Tacz. P. Z. S. 1874, p. 528.

Une femelle de Tambillo du 23 décembre 1877.

8. *XENOPS RUTILUS*, Licht. ; Tacz. P. Z. S. p. 1874, p. 529.

Trois exemplaires de Tambillo, recueillis entre le 2 septembre et le 22 décembre 1877, et un mâle de Guajango du 24 avril 1878. Iris brun foncé.

\*9. *XIPHOCOLAPTES PROMEROPHIRHYNCHUS* (Less.) ?

Un mâle tué à Tambillo le 17 septembre 1877.

Cet exemplaire diffère beaucoup des oiseaux de Santa Fé de Bogota et des environs de Medellin, avec lesquels je l'ai comparé. Son bec est beaucoup plus élevé, plus comprimé, plus ou moins court, à dos considérablement plus arqué, d'une couleur cornée blanchâtre claire, et plombé plus foncé près de la naissance. La couleur générale du plumage plus foncée ; les stries roussâtres du dessus de la tête, du cou et du devant du dos plus fines ; sur la gorge fauve roussâtre une suite de taches brunes forme deux raies longitudinales bien distinctes ; sur le bas de la gorge, la poitrine et les côtés il y a également des flammèches roussâtres, mais bordées des deux côtés d'une ligne noire bien distincte. Le milieu du ventre est largement couvert de plumes fauves roussâtres, dont chacune est variée de deux rangées de taches noirâtres parallèles et distinctement séparées entre elles, ce qui fait une tacheture bien prononcée. Les subcaudales sont plus foncées que les plumes précédentes, et également variées de noir. Le roux du croupion est plus obscure que dans l'espèce citée ; les ailes et la queue plus foncée. Taille un peu plus forte : aile pliée

152, queue 135, tarse 32, doigt externe sans ongle 28, bec depuis la commissure 52, hauteur du bec vis-à-vis les narines 12 mill.

Son bec est encore plus élevé et plus comprimé que celui du *X. albicollis* (V.) du Brésil, et beaucoup moins long que le bec du *X. major* (V.) et *X. procerus*, Cab.

Il me paraît que c'est une forme bien distincte du *X. promeropirhynchus*; mais comme je ne possède qu'un individu unique, je me contente à présenter mes remarques, jusqu'à ce que je reçoive un plus grand nombre d'exemplaires.

10. PICOLAPTES LACRYMIGER (Lafr.), Tacz. P. Z. S. 1874, p. 529.

Un mâle et deux femelles tués à Tambillo entre le 10 septembre 1877 et le 17 janvier 1878. Iris brun foncé.

#### Family FORMICARIIDÆ.

\*1. THAMNOPHILUS NÆVIUS (Gm.).

Deux mâles de Guajango, pris en avril 1878. Iris brun clair.

2. DYSITHAMNUS SEMICINEREUS, ScL.; Tacz. P. Z. S. 1874, p. 530.

Deux mâles et une femelle de Tambilla, recueillis le 16 janvier et le 18 février 1878. Iris brun foncé.

\*3. GRALLARIA REGULUS, ScL. P. Z. S. 1860, p. 66.

Une femelle de Tambillo du 10 janvier 1878. Iris brun foncé.

#### Family TYRANNIDÆ.

1. OCHTHŒCA LESSONI, ScL.; Tacz. P. Z. S. 1874, p. 533.

Un mâle de Tambillo du 17 juin 1878. Iris brun foncé.

2. OCHTHŒCA THORACICA, Tacz. P. Z. S. 1874, p. 133 et 533.

Une femelle du 13 décembre 1877.

3. OCHTHŒCA LEUCOMETOPA, ScL. et Salv. P. Z. S. 1877, p. 19.

*O. leucophrys*, Tacz. P. Z. S. 1874, p. 533.

Une paire de Chota à 8000' d'altitude, du 1 et du 6 août 1877. Les oiseaux de Huanta et d'Arancocha, indiqués dans la liste citée, appartiennent aussi à cette forme, nouvellement distinguée de celle de la Bolivie. Iris brun foncé.

\*4. OCHTHŒCA GRATIOSA, ScL.

Une femelle de Tambillo du 14 janvier 1878.

M. Stolzmann écrit :— "Cet oiseau construit un nid en forme d'une poire oblongue, suspendu sur des lianes verticales, de sorte que le nid en comprenant les rameaux du liane ressemble à une touffe de mousse, mais il se trahit par la régularité de sa forme. Il est bâti en entier de la mousse, et garni à l'intérieur des plumes de différents oiseaux, parmi lesquelles celles des Trogons étaient les plus nom-

breuses. L'ouverture est en bas. Ordinairement il est suspendu à une petite distance du sol, et j'ai trouvé deux situés au-dessus d'un petit ruisseau. Un nid trouvé dans le commencement de février contenait deux petits récemment éclos. L'œuf fourni était trouvé le 28 mai; comme il était unique, je l'ai laissé dans l'espoir que la femelle pondra plus. Dans deux jours j'ai trouvé le nid par terre, déchiré, et deux œufs couchés à côté. Un était brisé et l'autre intact. En vain j'ai cherché la mère; le mâle était tué deux jours plus tôt, mais il était gâté. Il ne diffère en rien de la femelle."

L'œuf est blanc jaunâtre, très peu luisant, de forme ovoïde, peu allongé, à deux extrémités obtuses. Longueur 18 sur 13·2 millim. de largeur.

\*5. *OCHTHÆCA CALOPTERA* (Scl.).

*Formicivora caloptera*, Scl. P. Z. S. 1859, p. 142.

Un mâle et deux femelles de Tambillo recueillis entre le 20 septembre 1877 et le 16 juin 1878. Iris brun foncé.

\*6. *SERPOPHAGA PÆCIOCERCA*, Scl.

Un mâle et une femelle recueillis le 22 novembre 1877 et le 20 mars 1878. Iris brun foncé.

7. *SERPOPHAGA CINEREA* (Strickl.); Tacz. P. Z. S. 1874, p. 535.

Un mâle et deux femelles recueillis à Tambillo le 20 septembre 1877 et le 16 juin 1878. Iris brun foncé.

8. *MUSCISAXICOLA RUFIPENNIS*, Tacz. P. Z. S. 1874, p. 533.

Une femelle tuée le 14 juillet à Agua blanca (entre San Gregorio et San Miguel), ressemble en tout au mâle et n'en diffère que par une taille un peu plus petite; longueur de l'aile mesure 130 mm., tandis que dans le mâle elle est de 142.

\*9. *PLATYRHYNCHUS ALBIGULARIS*, Scl.

Un mâle tué à Tambillo le 1 avril 1878. Iris brun foncé.

10. *ANÆRETES ALBICRISTATUS*, Vig.; Tacz. P. Z. S. 1874, p. 535.

Deux mâles et une femelle recueillis à Chota, 8000' d'altitude, le 3 et le 15 août. Iris brun foncé.

11. *CYANOTIS AZARÆ* (Naum.); Tacz. P. Z. S. 1874, p. 535.

Une femelle et un jeune de Pacasmayo du 9 et du 14 juin 1877. Iris de la femelle blanc bleuâtre, du jeune brun foncé.

12. *MIONECTES STRIATICOLLIS* (Lafr. et Orb.); Tacz. P. Z. S. 1874, p. 535.

Deux mâles et une femelle de Tambillo du 23 septembre et du 19 novembre 1877. Iris brun foncé.

\*13. *LEPTOPOGON MINOR*, n. sp.

*Supra olivaceo-viridis, pileo schistaceo, superciliis albidis, macula*

*auriculari nulla; subtus flavus, gula albida, alis nigricantibus rufo bifasciatis; secundariis rufescenti marginatis. Rostrum nigrum; pedes nigricantes; iris fusco-brunnea.*

Le dessus de la tête est d'une couleur ardoise; bande sourcilière blanchâtre, étroite mais distincte; les côtés de la tête sont gris verdâtres sans tache auriculaire foncée. Le dos olive verdâtre; tout le dessous du corps jaune pâle, un peu nuancé de grisâtre sur la poitrine; le devant de la gorge blanchâtre. L'aile est noirâtre, traversé de deux larges bandes roussâtres, composées de taches terminales des grandes couvertures et des dernières moyennes; les remiges primaires finement bordées de jaunâtre, les bordures des secondaires roussâtres et ne commençant qu'à une certaine distance de la naissance; les subalaires jaunâtres. Les rectrices sont noirâtres en dessus et grises en dessous, bordées d'une nuance olivâtre. Le bec est aussi court que dans le *L. ophthalmicus*, mais beaucoup moins large, noirâtre; les pattes noirâtres. Iris brun foncé.

C'est une forme voisine du *L. pœcilotis*, mais plus petit et bien distinct par le manque de la tache auriculaire foncée.

♂. Long. tot. 143 mill., envergure 202, aile 61, queue 56, bec depuis la commissure 11, tarse 13. ♀. Long. tot. 127 mill., envergure 183.

Trois exemplaires de Tambillo, pris entre le 13 novembre 1877 et le 2 janvier 1878.

#### 14. PHYLLOMYIAS TUMBEZANA, Tacz. P. Z. S. 1877, p. 325.

Nombreux exemplaires de Guajango recueillis en avril 1878, et de Pacasmayo pris en juin 1877.

#### 15. ORNITHION PUSILLUM (Cab.); Tacz. P. Z. S. 1874, p. 536, et 1877, p. 325.

Une femelle de Pacasmayo du 7 juin 1877.

L'œuf trouvé à Tumbes le 2 mars 1877, est d'une forme ovée, assez allongée, à deux bouts considérablement amincis, de sorte que le sommet est très peu moins gros que la base. La couleur est blanche avec une couronne au gros bout, composée de rares points et de petites taches rouges, assez pales; sur le reste de la surface il y a aussi quelques points. La surface est mate, la coque blanche en transparence. Dimensions, 16.3 × 12 mm.

#### \*16. ORNITHION IMBERBE, Scl.

Trois exemplaires de Guajango recueillis en avril 1873. Iris brun foncé.

#### 17. ELAINEA ALBICEPS (Laf. et Orb.); Tacz. P. Z. S. 1874, p. 536.

Trois exemplaires de Tambillo, recueillis en septembre, et un de Chota, 8000' d'altitude du 1 août 1877. Iris brun foncé.

Un œuf trouvé à Tambillo le 1 mars 1878 est blanc jaunâtre, mat, orné d'une quinzaine de mouchetures brunes rougeâtres, très-foncées, rangées en une couronne autour du gros bout, outre lesquelles il y a

encore un certain nombre de tout petits points beaucoup plus pâles. La coque dans sa transparence est jaune. La forme ovée, obtuse au gros bout et fort amincie au petit. Dimensions, 21·5 sur 16·3 mm.

18. *ELAINEA OBSCURA* (Lafr. et Orb.); Tacz. P. Z. S. 1874, p. 536.

Six exemplaires de Tambillo, recueillis entre le 11 septembre et le 1<sup>er</sup> octobre 1877. Iris brun foncé.

19. *MYIOBIUS RUFESCENS*, ScL.; Tacz. P. Z. S. 1874, p. 538.

Une paire (♂ et ♀) de Pacasmayo du 5 et du 11 juin 1877. Iris brun foncé.

20. *MYIOBIUS CINNAMOMEUS* (Lafr. et Orb.); Tacz. P. Z. S. 1874, p. 537.

Trois exemplaires de Tambillo du 5 septembre et le 10 octobre 1877. Iris brun foncé.

21. *PYROCEPHALUS RUBINEUS* (Bodd.); Tacz. P. Z. S. 1877, p. 336.

Plusieurs exemplaires des deux sexes de Pacasmayo, recueillis en juin 1877, et de Guajango, pris en avril 1878.

Tous ces individus des deux localités, également que ceux de Tumbes sont d'une taille considérablement plus petite que les oiseaux des environs de Lima, et présentent une différence dans la coloration de la femelle, qui dans celle forme plus petite est beaucoup plus rouge sur les parties inférieures du corps.

22. *EMPIDOCANES PÆCILURUS*, ScL.; Tacz. P. Z. S. 1874, p. 538.

Deux femelles de Tambillo, du 29 septembre 1877 et du 24 mars 1878. Iris des adultes rouge, dans les jeunes brun foncé.

\* 23. *EMPIDONAX MINIMUS* (Baird)?

Une femelle de Guajango du 11 avril 1878, et une autre de Tambillo du 21 novembre 1877. Iris brun foncé.

24. *EMPIDONAX ANDINUS*, Tacz. P. Z. S. 1874, p. 539.

Deux mâles de Chota, 8000' d'altitude, pris le 30 juillet et le 3 avril 1877.

25. *CONTOPUS ARDESIACUS* (Lafr.); Tacz. P. Z. S. 1874, p. 539.

Cinq exemplaires de Tambillo, pris entre le 17 septembre 1877 et le 6 janvier 1878. Iris brun foncé.

26. *MYIARCHUS NIGRICANS*, Cab.; Tacz. P. Z. S. 1874, p. 539.

Une femelle de Tambillo du 8 septembre 1877. Iris brun foncé.

27. *MYIARCHUS NIGRICEPS*, ScL.; Tacz. P. Z. S. 1874, p. 539.

Trois mâles et trois femelles de Tambillo, recueillis entre le 15 septembre 1877 et le 24 mars 1878. Iris brun foncé.

\*28. MYIARCHUS SEMIRUFUS, Scl. P. Z. S. 1878, p. 148, tab. xi.

Trois mâles tués à Pacasmayo dans la première moitié de juin 1878. Iris brun foncé.

29. TYRANNUS MELANCHOLICUS, Vieill.; Tacz. P. Z. S. 1874, p. 539.

Un mâle de Pacasmayo du 12 juin, et une femelle de Tambillo du 23 septembre 1877. Iris brun foncé. M. Berlepsch a remarqué que les oiseaux de Tambillo sont plus grands que ceux de la Nouvelle Grenade et du Surinam. J'ai comparé plusieurs individus des différentes localités du Pérou avec une paire de Cayenne se trouvant au Musée de Varsovie, et j'ai trouvé la même différence : l'aile dans les péruviens mesure 120-122 mm., tandis que ceux de Cayenne n'ont que 110 mm.; quant à la coloration il n'y a aucune différence.

#### Family COTINGIDÆ.

1. PACHYRHAMPHUS ALBOGRISEUS (Scl.); Tacz. P. Z. S. 1877, p. 327.

Cinq exemplaires en différents plumages de Tambillo et de Guajango, pris en décembre, en janvier, et en avril. Iris brun foncé.

2. PACHYRHAMPHUS VERSICOLOR (Hartl.); Tacz. P. Z. S. 1874, p. 540.

Deux jeunes de Tambillo du 23 juin 1878. Iris brun foncé.

3. PIPREOLA LUBOMIRSKII, n. sp. (Plate XXII.)

*Mas læte viridis, capite colloque antico nigro-coracinis; abdomine medio, crisso subcaudalibusque luteis; rostro corallino; pedibus nigricantibus; iridibus aurantiacis.*

*Fœm. mari similis, capite dorso concolori; pectore abdomineque flavo striatis; subcaudalibus flavis viridi maculatis; rostro rubro-brunneo.*

La couleur du mâle est vert de pré; la tête, le devant de la gorge et le milieu du haut de la poitrine sont d'un noir intense luisant, coupé transversalement en bas, et prolongé de chaque côté en une raie noire séparant le vert des côtés de la poitrine de la couleur jaune jonquille qui occupe le milieu du bas de la poitrine, le milieu de l'abdomen et les subcaudales. Les rémiges sont noirâtres, largement bordées de vert; les rectrices vertes en dessus et grises foncées avec une nuance verdâtre en dessous; les subalaires jaunes, variées de noirâtre le long du bord de l'aile; les rémiges bordées intérieurement de jaune pâle. Le bec est d'un rouge de corail; les pattes noirâtres; iris d'un jaune orangé.

La femelle est verte en dessus, d'une nuance un peu moins pure que celle du mâle; les côtés du visage et de la gorge sont d'une couleur verte sale, moins intense que celle des parties environnantes; le milieu du bas de la poitrine et le ventre sont largement striés de jaune; cette dernière couleur devient de plus en plus prédominante en avançant sur la partie postérieure du corps; le milieu des sub-



caudales est vert largement bordé de jaune; les ailes et la queue comme dans le mâle. La mandibule supérieure est brune rougeâtre, l'inférieure d'un rouge sale, moins foncée que la précédente; l'iris et les pattes comme dans le mâle.

♂. Long. totale 196 mm., envergure 300, aile 92, queue 62, bec depuis la commissure 20, tarse 21. ♀. Long. totale 205 mm., envergure 304, aile 95, queue 62, bec depuis la commissure 20, tarse 21.

Deux mâles et une femelle de Tambillo du 9 septembre 1877 et du 22 mars 1878.

Je dédie cette jolie nouvelle espèce à M. le Prince Ladislas Lubomirski, savant conchyliogiste, comme hommage rendu aux travaux qu'il entreprend pour la mise en ordre des collections conchyliologiques du Musée de Varsovie, et au zèle qu'il ne cesse pas de déployer pour l'accroissement et le développement de cette institution.

4. *HELIOCHERA RUBROCRISTATA* (Lafr. et Orb.); Tacz. P. Z. S. 1874, p. 570.

Un mâle de la montaña de Palto, du 17 décembre 1877. Iris rouge carminé.

\*5. *HELIOCHERA RUFAXILLA*, Tsch.

Une femelle de Tambillo, tuée le 18 mars 1878. Iris rouge.

#### Family TROCHILIDÆ.

\*1. *OREOTROCHILUS LEUCOPLEURUS*, Gould.

Un mâle adulte de Cutervo, s'accordant en tout avec la description dans la Monographie de Mulsant, excepté la taille qui est un peu plus forte (l'aile pliée 75 mill.), bande longitudinale ventrale noire, commençant plus près de la poitrine que dans le *O. chimborazi*.

2. *PETASOPHORA ANAIS* (Less.); Tacz. P. Z. S. 1874, p. 541.

Une femelle de Tambillo du 28 novembre 1877. Iris presque noir.

\*3. *PETASOPHORA CYANOTIS* (Bourc.).

Quatre exemplaires de Tambillo, recueillis en septembre 1877.

4. *PANOPLITES MATHEWSI* (Bourc.); Tacz. P. Z. S. 1874, p. 544.

Cinq exemplaires recueillis à Tambillo en septembre et en décembre 1877.

5. *ACESTRURA MULSANTI* (Bourc.); Tacz. P. Z. S. 1874, p. 544.

Une paire de Tambillo du 13 et du 23 septembre.

\*6. *CHÆTOCERCUS BOMBUS*, Gould.

Cinq mâles recueillis à Tambillo depuis le 11 décembre 1877 jusqu'au 27 mars 1878.

\*7. MYRTIS FANNY (Less.).

Un jeune mâle pris sur la montaña de Chule (Chota), 9000' d'altitude.

8. *STEGANURA PERUVIANA*, Gould; Tacz. P. Z. S. 1877, p. 544.

Une paire de Tambillo du 27 septembre et du 13 décembre 1877.

\*9. *LESBIA GRACILIS*, Gould.

Cinq exemplaires de Tambillo et de Chota jusqu'à 9000' d'altitude, recueillis depuis le 24 avril 1877 jusqu'au 24 décembre 1878.

10. *METALLURA SMARAGDINICOLLIS* (Lafr. et Orb.); Tacz. P. Z. S. 1874, p. 544.

Une paire de Chota (8000') et de Tambillo du 30 juillet et du 25 septembre 1877.

\*11. *ADELOMYIA MELANOGENYS* (Fraser).

Plusieurs oiseaux recueillis à Tambillo depuis septembre jusqu'au décembre 1877.

12. *PATAGONA GIGAS* (Vicill.); Tacz. P. Z. S. 1874, p. 545.

Un jeune mâle de Chota (8000') du 30 juillet 1877.

\*13. *HELIOTRYPHA VIOLA*, Gould.

Plusieurs exemplaires recueillis à Tambillo depuis le 20 septembre 1877 jusqu'au 18 mars 1878.

Les femelles fournies par M. Stolzmann sont différentes de la description dans l'ouvrage de M. Mulsant; je donne donc leur description. Le vert des parties supérieures du corps est plus clair que dans le mâle, avec un éclat doré répandu partout jusqu'aux rectrices médiales; la plaque frontale et la bande pectorale moins brillantes et d'une nuance plus pâle; le violet de la plaque gutturale moins brillant, d'une nuance générale plus rougeâtre et bordée en bas d'une bande cuivreuse dorée, distincte dans certaines directions de la lumière. Les plumes vertes abdominales sont entourées d'une bordure grisâtre; les subcaudales présentent très-peu de vert. Les rectrices externes fort imprégnées de vert sur leurs deux pages. La queue de la même forme, mais beaucoup plus courte, et à rectrices moins étagées. Le reste comme dans le mâle.

Un jeune mâle ressemble à la femelle; sa plaque gutturale est plus terne, plus bleuâtre dans certaines directions et moins rouge, la bordure cuivreuse plus distincte, les bordures des plumes abdominales d'une teinte roussâtre, les subcaudales roussâtres avec une tache centrale foncée peu prononcée. Les dimensions comme dans la femelle.

♂. Longit. totale 129-131 mm., envergure 156-160, bec depuis les narines 14, aile 67, queue 58, largeur des rectrices externes 8.8.  
♀. Long. tot. 122-123 mm., envergure 148-149, bec depuis les narines 14, aile 60, queue 46, largeur des rectrices externes 8.8.

14. LAMPROPYGIA CÆLIGENA (Less.); Tacz. P. Z. S. 1874, p. 543.

Un mâle de la montaña de Palto du 17 décembre 1877, et une femelle de Tambillo du 18 janvier 1878.

\*15. LEUCOLIA PELZELNI, n. sp.

♀. *Rostrum subarquatum, dimidia parte corporis sublongius; pileo viridi nitido; corpore supra viridi-subcupreo; cauda subtruncata, vix emarginata, rectricibus viridi-cæneis, externis in apice cinereis et macula longitudinali fusca notatis; corpore subtus albo sericeo; lateribus colli et capitis maculis splendidis viridi-cæruleis ornatis; lateribus epigastrii viridi maculatis; ventris lateribus viridibus; subcaudalibus albis.*

Bec très-peu courbé, un peu plus long que la moitié de la longueur du corps, graduellement rétréci depuis la base jusque près de l'extrémité, où il est légèrement renflé, puis brusquement rétréci en pointe; mandibule noire, mâchoire blanchâtre avec l'extrémité noire. Dessus de la tête revêtu de plumes vertes médiocrement brillantes; tout le dessus du corps d'un vert bronzé à peu près uniforme partout. Queue presque tronquée, à rectrices médianes sensiblement plus courtes que les autres; les externes un peu moins longues que celles de la deuxième paire; les médiaires vertes, légèrement bronzées, les autres d'un vert un peu moins brillant; l'externe largement terminée de cendré clair, l'extrémité pareille de la suivante plus petite, et sur la troisième réduite à un mince liséré; sur ces trois rectrices latérales il y a une tache noirâtre située longitudinalement sur la tige près de l'extrémité de la partie verte. La page inférieure de la queue un peu plus pâle que la dorsale; les tiges brunes en dessus, et blanchâtres en dessous. Ailes aussi longues que les rectrices, brunes violâtres. Tout le dessous du corps depuis le bec jusqu'à l'extrémité du ventre blanc soyeux pur; les côtés de la tête et du cou parsemés de plumes squammiformes d'un bleu verdâtre clair, fort luisant; les côtés de l'épigastre variés de taches vertes, en réduisant à la moitié l'espace blanc pur de la poitrine, les côtés mêmes du ventre sont aussi verts; les subcaudales blanches pures. Pattes noirâtres. Iris presque noir.

Long. de l'aile 53 mm., queue 33, bec dans sa partie dénudée 22.

Une femelle de Guajango sur le haut Marañon, tuée le 1<sup>er</sup> mai 1878.

Cette Leucolie diffère de toutes les congénères par la couleur des plumes brillantes sur les côtés du cou et de la tête, bien distincte du vert des parties supérieures du corps, ainsi que par la forme des taches noires sur les rectrices externes; le blanc est encore plus répandu sur le dessous du corps que dans la *L. candida*.

\*16. THAUMASIUS TACZANOWSKII, Sel. antea, p. 145.

Un mâle de Guajango du 12 avril 1878.

17. AMAZILIA LEUCOPHÆA, Reichb.; Tacz. P. Z. S. 1877, p. 327.

Deux mâles de Pacasmayo, pris en Juin 1877.

## Family CAPRIMULGIDÆ.

## \*1. NYCTIBIUS CORNUTUS (Vieill.).

Une femelle des environs de Tambillo, 7500' d'altitude, tuée le 17 juin 1878. Iris jaune.

## \*2. LUROCALIS NATTERERI, Temm.

Une femelle de Tambillo du 13 février 1878. Iris presque noir.

3. NYCTIDROMUS ALBICOLLIS (Gm.); Tacz. P. Z. S. 1877, p. 327.

Une paire de Tambillo, tuée en décembre 1877 et un mâle de Gujango, tué le 11 avril 1878. Iris presque noir.

## Family PICIDÆ.

1. CAMPEPHILUS MELANOLEUCUS (Gm.); Tacz. P. Z. S. 1877, p. 546.

Un mâle tué à Guajango le 16 avril 1878. Iris jaune.

2. CHLORONERPES FUMIGATUS (Lafr. et Orb.); Tacz. P. Z. S. 1874, p. 546.

Une paire de Tambillo du 19 décembre 1877 et du 5 janvier 1878. Iris brun foncé.

## Family ALCEDINIDÆ.

CERYLE CABANISI (Tsch.); Tacz. P. Z. S. 1874, p. 547, et 1877, p. 328.

Une femelle de Pacasmayo, tuée le 13 juin 1877. Iris brun foncé.

## Family TROGONIDÆ.

PHAROMACRUS AURICEPS (Gould).

*Calurus pavoninus*, Tacz. P. Z. S. 1874, p. 547.

Six exemplaires de Tambillo, tués entre le 7 septembre et le 23 décembre 1877. Iris brun foncé; bec orangé; pattes grises, le dessous des doigts d'un orangé sale.

## Family CUCULIDÆ.

1. CROTOPHAGA SULCICROSTRIS, Sw.; Tacz. P. Z. S. 1874, p. 548.

Un mâle de Guajango, tué le 14 avril 1878. Iris presque noir.

2. PIAYA NIGRICRISIA, ScL.; Tacz. P. Z. S. 1874, p. 548.

Une femelle de Tambillo, tuée le 17 septembre 1877. Iris rouge de sang; les parties dénudées autour des yeux de la même couleur rouge dans la moitié supérieure, et grise dans la moitié inférieure. Bec jaune verdâtre, plus vert à la base; les pattes grises plombées.

3. *COCYZUS ERYTHROPHthalmus* (Wils.); Tacz. P. Z. S. 1877, p. 328.

Une femelle de Guajango, tuée le 20 avril 1878, ressemble complètement au mâle de Lechugal, mais elle est beaucoup plus grande : l'aile est longue de 148 mm., tandis que dans le mâle elle l'est de 135 la queue a 164 de longueur, dans le mâle 140. Le dessus de la tête est dans les deux exemplaires concolore au dos, mais le front est largement cendré. Le bec est noirâtre, avec une tache jaunâtre au milieu de la face inférieure de la mâchoire. Iris brun foncé ; le tour de l'œil jaune sale.

#### Family PSITTACIDÆ.

*ARA MILITARIS* (L.); Tacz. P. Z. S. 1874, p. 549.

Une femelle de Guajango, tuée le 28 avril 1868. Iris orangé à l'extérieur, passant graduellement en brun vers le centre, la pupille même entourée d'un anneau plus clair.

#### Family STRIGIDÆ.

\*1. *SCOPS BRASILIANUS* (Gm.).

Une paire de Guajango, tuée le 12 avril et le 2 mai 1878. Iris jaune.

Le mâle a le dessus de la tête brun foncé, à tiges des plumes noires bien dessinées sur le fond brun, et quelques petites taches rousses peu apparentes, entouré d'une large bande sourcilière blanche variée de brun, et de la bande nuchale bien distincte. En général il n'a point de nuance rousse sur les parties inférieures du corps. Dans la femelle la calotte brune est parsemée de nombreuses petites taches rousses, et la teinte générale est colorée de fauve roussâtre.

\*2. *PULSATRIX TORQUATA* (Daud.).

Une femelle de Guajango, tuée le 16 avril 1878. Iris jaune.

3. *GLAUCIDIUM PHALÆNOIDES* (Daud.); Tacz. P. Z. S. 1877, p. 329.

Une femelle de Guajango du 25 avril 1878. Iris jaune très-pale.

#### Family FALCONIDÆ.

1. *ASTURINA MAGNIROSTRIS* (Gm.); Tacz. P. Z. S. 1874, p. 552.

Un mâle tué à Tambillo le 7 septembre 1877. Iris jaune; cire, tour des yeux et pattes orangées.

\*2. *URUBITINGA MERIDIONALIS* (Lath.).

Une paire de Guajango du 21 avril 1878. Iris brun clair; cire jaune; pattes d'un orangé sale.

\*3. *ACCIPITER ERYTHROCNE* (Scl.).

Une femelle prise à Shanyn le 15 novembre 1877. Iris jaune, ainsi que le tour des yeux; pattes orangées.

## \*4. MICRASTUR GUERILLA, Cass.?

Un jeune oiseau de Guajango, tué le 14 avril 1878. Iris jaune très-pale; pattes jaunes.

5. TINNUNCULUS CINNAMOMINUS (Sw.); Tacz. P. Z. S. 1874, p. 550.

Un mâle de Chota 8000' d'altitude, du 30 juillet 1877. Iris brun foncé; cire et pattes orangées.

6. CYMINDIS MEGARHYNCHUS (Des Murs); Tacz. P. Z. S. 1874, p. 550.

Quatre exemplaires recueillis à Guajango en avril de 1878, différents entre eux en coloration et sont aussi différents des exemplaires d'Amable-Maria et de Soriano, dont j'ai donné la description dans l'article cité.

Un mâle, probablement très-adulte est d'un cendré bleuâtre foncé, rayé transversalement de blanc sur la poitrine et le ventre, de sorte que les raies blanches sont deux fois plus fines que les cendrées. Les rémiges raïées de noir et sur la page inférieure les intervalles clairs sont blanchâtres, et blancs purs dans la première moitié des plumes. Les rectrices sont noires à deux larges bandes blanches, dont la terminale est fort colorée de cendré. Les subalaires sont cendrées, rayées de blanc; tectrices caudales noires terminées d'une bordure blanche; les subcaudales blanches. Iris blanc; peau nue autour des yeux bleue verdâtre; avec une tache jaune devant l'œil; pattes orangées.

Un autre mâle est semblable au précédent, et n'en diffère que par la couleur des raies abdominales, qui sont roussâtres et s'étendent sur toute la poitrine; les bandes claires caudales sont fort colorées de roussâtre; les sous-caudales rousses; les bordures des sus-caudales cendrées claires.

Les deux jeunes en premier plumage sont aussi différents entre eux, ainsi que de celui qui a été décrit dans l'article cité. Un d'eux n'a les bordures rousses qu'aux ailes, tandis que l'autre les a aussi sur le dos, excepté la partie voisine du cou. Le fond de tout le dessous est dans les deux d'un fauve isabelle, rayé transversalement de brun. Les côtés du visage sont cendrés dans le premier de ces exemplaires, et la gorge isabelle; dans l'autre les côtés du visage ainsi que la gorge sont d'un roux cannelle, rayé de plus foncé sur la gorge. Dans le premier les sus-caudales sont bordées de blanc, dans le deuxième de roux. Iris est blanc dans le premier, et blanc sale dans le dernier.

## Family ARDEIDÆ.

## \*1. TIGRISOMA SALMONI, Schl. et Salv.

Un mâle tué à Tambillo le 18 septembre 1877 s'accorde en tout avec la description, si ce n'est que tout le dessus de la tête est finement rayé de roux; le ventre est gris, teint légèrement de roussâtre. Iris jaune; parties nues du visage jaunes verdâtres.

2. *BUTORIDES VIRESCENS* (L.); Tacz. P. Z. S. 1877, p. 746.

Un mâle adulte et un jeune de Pacasmayo, tués en juin 1877. Iris, tour des yeux et pattes jaunes.

## Family ANATIDÆ.

\*1. *DAFILA BAHAMENSIS* (L.).

Un mâle tué à Tumbez le 2 mai 1877.

2. *MERGANETTA LEUCOGENYS*, Tsch.; Tacz. P. Z. S. 1874, p. 554.

Un poussin tout petit de Tumbez. Il est blanc, avec le dessus de la tête, une strie postoculaire, une bande le long du cou et du dos, les ailes et une large raie de chaque côté du dos bruns. La queue composée de rectrices longues, rigides, à barbes rares.

## Family COLUMBIDÆ.

1. *TALPACOTIA GODINA*, Bp.; Tacz. P. Z. S. 1874, p. 555.

Un jeune mâle de Guajango du 9 avril 1878. Iris composé de deux anneaux, dont l'externe est blanc sale, l'interne gris foncé.

2. *COLUMBULA CRUZIANA* (Knip et Prév.); Tacz. P. Z. S. 1874, p. 555.

Un exemplaire de Tambillo.

## Family CRACIDÆ.

1. *ABURRIA CARUNCULATA*, Reichb.; Tacz. P. Z. S. 1874, p. 558.

Un mâle, une femelle et un poussin de Tambillo, pris le 4 décembre 1877 et le 10 janvier 1878. Iris rouge-cérise très-foncé. Bec d'un beau bleu dans sa moitié basale; le sac guttural jaune pâle; pattes de couleur chair-rougeâtre. Le poussin en duvet a la tête et le cou roux, avec une grande tache frontale, une large raie le long du milieu de la tête et du cou et une autre raie moins large de chaque côté du dessus de la tête noirs. Le dos brun au milieu, varié de fauve sur les côtés; ailes brunes, couvertures alaires tachetées de roux; grandes couvertures et rémiges terminées chacune d'une goutte fauve, dont les premières constituent deux bandes transversales; queue brune, rectrices terminées d'une bordure rousse. Le devant de la gorge et le haut de la poitrine d'un roux uniforme, de plus en plus pâle en s'approchant du ventre, qui est blanc-jaunâtre uniforme; duvet de la jambe gris-roussâtre; subcaudales d'un roux sale.

2. *PENELOPE SCLATERI*, Gr.; Tacz. P. Z. S. 1874, p. 558.

Un mâle tué à Tambillo le 29 novembre 1877. Iris brun foncé; sac guttural de la couleur chair avec une faible nuance orangée; parties nues autour des yeux grises, très-foncées; paupières plus claires; pattes d'un rouge framboise, légèrement enfumé.

## Family RALLIDÆ.

## \*RALLUS NIGRICANS, Vieill. ?

Deux jeunes en premier plumage, tués à Pacasmayo en juin 1877. Iris de la couleur terre de Sienne.

## Family CHARADRIIDÆ.

## \*ÆGIALITIS VOCIFERA (L.).

Deux exemplaires de Pacasmayo, tués en juin 1877. Iris brun foncé ; tour des yeux vermillon.

## Family PODICIPITIDÆ.

## \*PODICEPS MAJOR, Bodd.

Une femelle adulte de Chimbote, tuée en novembre 1875.

*Addenda.*

## CYANOCORAX MYSTACALIS (Geoff.).

Les œufs recueillis à Tumbez dans le commencement de mars 1877, sont de la même forme que ceux de la pie d'Europe ; les uns ont le petit bout fort aigu, les autres l'ont beaucoup plus obtus. La surface peu luisante. Le fond est jaunâtre, très-pâle, varié de nombreuses petites taches irrégulières et de petits points gris pâles, et d'autres bruns, plus ou moins foncés, superficiels ; sur quelques-uns ces taches sont plus grosses au gros bout. Sur les œufs à taches plus grandes qu'à l'ordinaire les taches sont beaucoup moins nombreuses. Cette coloration ressemble beaucoup à celle des œufs d'*Ægialitis fluviatilis*. La coque est transparente et jaunâtre. Dimensions :  $31.6 \times 22.8$ ,  $31.4 \times 23$ ,  $32.3 \times 22.3$ ,  $33.2 \times 23.2$  millim.

## SYCALIS FLAVEOLA (L.).

Les œufs trouvés à Tumbez à la fin de février et au commencement de mars ressemblent beaucoup aux œufs du friquet (*Passer montanus* (L.)). Ils ont la même forme, les mêmes dimensions, et varient aussi en coloration. Le fond est blanc pur, ou légèrement verdâtre ou jaunâtre, varié de taches irrégulières, de diverses grandeurs, brunes pâles, et d'autres brunes ou d'un brun rougeâtre foncé, plus ou moins nombreuses sur toute la surface, et plus denses au gros bout, ou formant une couronne très-proche de l'extrémité même. Sur quelques-uns les taches sont très-nombreuses et couvrent la grande partie du fond. Dimensions :  $20 \times 15$ ,  $19.8 \times 17.6$ ,  $22 \times 17.6$ ,  $20.8 \times 15.2$  millim.

## CHLORONERPE CANIPILEUS (Laf. et Orb.).

L'œuf trouvé à Tumbez dans les premiers jours de mars 1877 a les dimensions suivantes :  $22.2 \times 17$  millim. L'éclat est à peu près comme dans les œufs du *Picus major* ; la coque blanche pure en transparence.



## COLUMBA MELODA, Tsch.

Les œufs trouvés à Tumbez au commencement de mars 1877 sont blancs, légèrement jaunâtres, à coque jaune en transparence. Dimensions :  $31.8 \times 24$ ,  $32 \times 23.8$ ,  $31.2 \times 24$ ,  $33.8 \times 23.5$  millim.

2. On Collections of Birds from Kina Balu Mountain, in North-western Borneo. By R. BOWDLER SHARPE, F.L.S., F.Z.S., Senior Assistant, Department of Zoology, British Museum.

[Received February 14, 1879.]

(Plate XXIII.)

The great mountain of Kina Balu has always been a locality of interest to the student of Bornean ornithology; but I am not aware that any notes on the natural history of this part of northern Borneo have ever been published. It gives me great pleasure, therefore, to give a list of the specimens obtained by Mr. Treacher's collectors, and of a few others submitted to me by Mr. Burbidge and obtained during his recent expedition to this mountain. The latter gentleman is well known from his successful botanical researches on Kina Balu; and I shall shortly lay before the Society an account of some of his ornithological discoveries in the Sooloo archipelago.

The present collection, though small, is of some importance; and the character of some of the birds seems to show that the mountains of Borneo, when thoroughly explored, will produce many species akin to those found in the mountains of Java, Sumatra, and even of the Himalayas.

## 1. BUTASTUR INDICUS.

*Butastur indicus* (Gm.), Sharpe, Cat. B. i. p. 297.

*Poliornis indica* (Gm.), Salvad. Ucc. Born. p. 9.

A specimen in nearly full plumage, collected by Mr. Burbidge.

## 2. BUBO ORIENTALIS.

*Bubo orientalis* (Horsf.), Sharpe, Cat. B. ii. p. 39.

*B. sumatranus* (Raffl.), Salvad. Ucc. Born. p. 19.

A fine adult specimen in Mr. Treacher's collection, agreeing with the diagnosis given by me (*l. c.*), and measuring 13 inches in the wing.

## 3. MEGALĒMA VERSICOLOR.

*Megalēma versicolor* (Raffl.), Marsh. Mon. Capit. pl. 22.

*Chotorea versicolor*, Salvad. tom. cit. p. 33.

Three adult specimens, obtained by Mr. Burbidge.

## 4. RHOPODYTES ERYTHROGNATHUS.

*Rhopodytes erythrognaethus* (Hartl.), Sharpe, P. Z. S. 1873, p. 604.

*Rhamphococcyx erythrognaethus* (Hartl.), Salvad. tom. cit. p. 74.

A specimen in Mr. Treacher's collection, having the two centre tail-feathers rufous at their ends.

## 5. HALCYON CHLORIS.

*Halcyon chloris* (Bodd.), Sharpe, Monogr. Alced. pl. 87.

*Sauropatis chloris* (Bodd.), Salvad. tom. cit. p. 103.

One specimen, sent by Mr. Treacher.

## 6. DENDROCHELIDON LONGIPENNIS.

*Dendrochelidon longipennis* (Rafin.), Salvad. tom. cit. p. 122.

One specimen, collected by Mr. Burbidge.

## 7. CORONE TENUIROSTRIS.

*Corone tenuirostris*, Moore, Cat. B. Mus. E.I. Co. ii. p. 558.

*Corvus tenuirostris*, Tweed. Ibis, 1877, p. 320.

One specimen in Mr. Treacher's collection.

The constant character of the long thin bill in specimens from N.W. Borneo impresses me with the idea that Lord Tweeddale is right in keeping *C. tenuirostris* distinct from *C. enca*, with which I united it in my 'Catalogue of Birds' (vol. iii. p. 43).

## 8. DICRURUS ANNECTENS.

*Dicrurus annectens*, Hodgs.; Sharpe, Cat. B. iii. p. 231; id. Ibis, 1878, p. 414.

The first occurrence of this species in Borneo was recorded by me in my list of Governor Ussher's Sarawak collection; but it cannot be uncommon in North-western Borneo, to judge from numerous specimens which have been sent from Labuan and from the opposite coast by Governor Ussher and Mr. Treacher. Two specimens are contained in the collection made on Kina Balu by Mr. Burbidge.

## 9. CHIBIA BORNEENSIS, sp. n.

*C. similis C. pectorali ex insulis Sulaensibus, sed plumis lanceolatis colli lateralis metallice chalybeo-viridibus nec purpurascens, et maculis jugularibus et præpectoralibus valde minoribus et conspicue metallicis chalybeo-viridibus distinguenda. Long. tot. 10, culm. 1.3, alæ 5.9, caudæ 4.5, tarsi 0.85.*

An adult and young bird in Mr. Treacher's collection.

This is an interesting addition to the avifauna of Borneo, and seems to indicate an entirely new species. It bears considerable resemblance to *C. bimaensis* of Timor and Lombok, but differs in having the long silky plumes on each side of the lower back black instead of greyish white; while the Timor bird has not, like *C. borneensis*, any long hair-like plumes on the head. On the other hand the latter character allies it to *C. pectoralis* of the Sula Islands; but

it may be recognized on comparison by the much smaller and more metallic spots on the throat and fore neck, which are steel-green, as also are the neck-hackles. In *C. pectoralis* the spangles are large, dull, and incline to purplish in tint. This species appears to me to be a thorough *Chibia*, and I do not at present see how naturalists can avoid recognizing the existence of *Chibia* in the Malay archipelago; nor do I understand how the Indian and Malayan species are to be separated, when such a perfect gradation is now offered by *C. borneensis* and *C. pectoralis*. Under these circumstances I believe that Salvadori's genus *Dicruropsis*, which I was lately inclined to admit (Mittheil. k. zool. Mus. Dresd. iii. p. 360), cannot be sustained; and I therefore revert to my old opinion concerning these birds (Cat. B. iii. p. 234). I have given this species the name of *borneensis* to celebrate the addition of a *Chibia* to the avifauna of Borneo. Mr. Treacher has also procured a single specimen of it on the Lawas river.

The young bird from Kina Balu differs from the adult in being duller black, with fewer and less metallic chest-spots and hackles.

10. BUCHANGA STIGMATOPS, sp. n.

*B. similis* *B. leucophææ*, sed *macula lorali alba magna distinguenda*. Long. tot. 10, culm. 0·9, alæ 5·3, caudæ 5·1, tarsi 0·7.

The presence of white on the facial region of a species of grey *Buchanga* would seem to ally it at once to *B. leucogenys*. In the Bornean bird, however, of which I have three specimens before me, the white is confined to a large loreal spot in front of the eye, whereas in *B. leucogenys* the eyebrow and ear-coverts, as well as the feathers below the eye, are also white or whitish. The new species is also of the same dark grey as *B. leucophæa* (*B. cineracea* of my Catalogue, iii. p. 250), and not of the light pearly grey which is another character of *B. leucogenys*. One specimen was contained in Mr. Burbidge's collection, and two in Mr. Treacher's.

11. PERICROCOTUS IGNEUS.

*Pericrocotus igneus*, Blyth; Salvad. tom. cit. p. 144; Sharpe, Cat. B. iv. p. 78.

An adult male, in Mr. Burbidge's collection.

12. TRACHYCOMUS OCHROCEPHALUS.

*Trachycomus ochrocephalus* (Gm.), Salvad. tom. cit. p. 197.

One specimen, in Mr. Burbidge's collection.

13. RUBIGULA MONTIS, sp. n.

*R. similis* *R. flaviventri*, sed *multo minor et gula flava nec nigra distinguenda*. Long. tota 5·7, culminis 0·5, alæ 3·1, caudæ 2·8, tarsi 0·7.

General colour above olive-yellowish, the wing-coverts like the back; quills and tail dull blackish brown, externally washed with olive-yellow like the back, the greater coverts also brown washed with olive-yellow; tail-feathers paler brown at the tip of the inner

web; head crested, black, as also the sides of the face, ear-coverts, and cheeks; entire under surface of body yellow, slightly more olive-green on the sides; under wing-coverts yellow, the longer ones white washed with yellow; quills sepia-brown below, white along the edge of the inner webs.

This species is almost exactly the same as *Rubigula atricapilla* of Ceylon, but has not the white tips to the tail-feathers, while its long crest distinguishes it from the Ceylonese species, which is not crested. In the form of the crest and in general appearance it is almost precisely similar to *R. flaviventris* of Pegu and Tenasserim, but is smaller and has the throat yellow like the rest of the under surface. The single specimen obtained was in Mr. Treacher's collection.

#### 14. *CRINIGER RUFICRISSUS*, sp. n.

*C. similis C. gutturali, sed supra ubique sordidior, supracaudalibus caudaque saturate rufescenti-brunneis; loris et regione oculari cum genis et regione parotica sordide cinereis, gula alba, corpore reliquo subtus sordide olivascens, subcaudalibus castaneis. Long. tot. 8, culm. 0.85, alæ 4.0, caudæ 4.0, tarsi 0.7.*

This species is not very different from *C. gutturalis*, but differs in its much darker coloration, especially on its under surface, which is dull olivaceous, with a white throat and chestnut-red under tail-coverts. There is an entire absence of the pale-brown colour of the breast washed with yellow, and of the light-yellow abdomen and pale fawn-coloured under tail-coverts. The crest is very long in *C. ruficrissus*, and extends nearly to the mantle.

#### 15. *IANTHOCINCLA TREACHERI*, sp. n. (Plate XXIII.)

*I. similis I. mitratæ (S. Müll.) ex Sumatra, sed genis, mento et regione parotica sicut caput castaneis facile distinguenda. Long. tota 10, culminis 0.85, alæ 4.15, caudæ 4.5, tarsi 1.5.*

*Adult.* General colour above dark ashy grey, with a very slight shade of ochraceous under certain lights; the wing-coverts slightly more bluish grey than the back; quills blackish, externally bluish grey, the primaries white along the basal part of the outer web, giving the wing a conspicuous white outer aspect; tail-feathers dark slaty grey, shading into blackish at the end of the feathers; entire crown and nape, as well as the sides of face, ear-coverts, and fore part of cheeks deep chestnut-red, the under cheek-feathers slightly tipped with ochraceous; frontal plumes with lanceolate tips of light ashy grey or hoary whitish; under surface of body dull ochraceous brown, with lighter shaft-lines of pale ochraceous, imparting a striped appearance to the throat and breast; the sides of the body more ashy grey; chin chestnut, like the sides of the face; thighs dark grey, with a few chestnut feathers near the tarsal bend; under tail-coverts chestnut; under wing-coverts ashy grey, slightly marked with ochraceous; quills sepia-brown below, paler along the edge of the inner web.

Four specimens are sent by Mr. Treacher, all adult, and exactly similar in plumage. On comparing them with Sumatran specimens

of *I. mitrata*, a very marked difference presents itself, which shows that the Kina-Balu bird belongs to a new species. Although similar to *I. mitrata* in its general coloration and white-edged quills, it is distinguished at once by its chestnut ear-coverts, while the chin and fore part of the cheeks are also chestnut.

16. *Turdus pallens*.

*Turdus pallens*, Pall.; Salvad. tom. cit. p. 256.

An adult specimen sent by Mr. Treacher.

17. *Monticola solitarius*.

*Monticola solitaria* (P. L. S. Müll.), Walden, Tr. Z. S. ix. p. 192.

A specimen sent by Mr. Treacher.

This is the second occurrence of the bird in Borneo, the first having been recorded by me under the name of *Monticola pandoo* (Ibis, 1877, p. 13), from Mr. Alfred Everett's Bintulu collection. Mr. Treacher's specimen is in full blue-and-red plumage, with the usual margins to the feathers found in the winter dress.

3. Observations on the Characters of the Echinoidea.—I. On the Species of the Genus *Brissus*, and on the allied forms *Meoma* and *Metalia*. By F. JEFFREY BELL, B.A. Magdalen College, Oxford, Zoological Department, British Museum.

[Received February 18, 1879.]

In an examination of the specimens of *Echinoidea* in the British Museum I have had as my chief aids the 'Catalogue of the Recent Echinoidea in the Collection of the British Museum,' part i., by Dr. J. E. Gray (London 1855), and the 'Revision of the Echini' of Prof. Alexander Agassiz, published at the University Press, Cambridge, U. S., 1872-73. It has been a difficult matter at times to hold a balance between systematists of such widely different principles.

Agassiz recognizes three species of the genus *Brissus*—*B. obesus*, Verrill, *B. carinatus*, and *B. unicolor*. As the Museum collection does not contain any specimen of *B. obesus*, I shall confine what I have to say to the two latter, which are thus distinguished by Agassiz (p. 357):—"The only features by which I am able to separate the two undoubted species of *Brissus* (*B. carinatus* and *B. unicolor*) are the proportions of the anterior and posterior pair of ambulacra, and the striking difference in the course of the fasciole in the anterior part of the test. In *B. carinatus* the posterior ambulacra are much shorter than the anterior pair, while they are nearly equal in *B. unicolor*. There is but one reentering angle in anterior part of fasciole on the anterior interambulacra, while there are two in *B. carinatus*."

Though Dr. Gray distinguishes a larger number of species (just the same, indeed as Agassiz and Desor), he seems to have had a better

acquaintance with his specimens; for he writes:—"The species of this section are most difficult to distinguish; they present several variations, which at first sight appear characters, . . . but these variations do not appear to be permanent in the specimens of the same habitat, but this fact requires verification with a larger series; the form of the fasciole is often different on the two sides of the same specimen" (p. 52).

It is this statement of Dr. Gray's that gives a more accurate account of the real facts of the case, though he might have added, indeed, that the reentering angles vary greatly in depth. Of fifteen specimens which I have examined from the large series in the Museum, four have one reentering angle on either side in the anterior interambulacra; one has no angle on the left, and one on the right side; one has one angle on the left and a shallow one on the right side; four have one angle on the left and two on the right side; and five have two on both sides. With the series in my hands I am therefore unable to come to any conclusion from Agassiz's second distinctive character.

With regard to the other point, the relative lengths of the anterior and posterior ambulacra, I have first to say that in no case that I know of are the anterior longer than the posterior ambulacra; and among such cases I reckon the representation given by Prof. Agassiz (pl. xxi. fig. 1); and, secondly, that of nine specimens selected, that in which the carinate character of the posterior odd interambulacrum was least well marked, had anterior ambulacra measuring 40 millims., and the posterior 43 millims., while in that in which the carination was most marked the anterior ambulacra measured 38 millims., and the posterior 40 millims.

The following Table gives some details as to the just-mentioned nine specimens, which are arranged in an increasing order of carination, as judged by the eye, and are all apparently well-grown specimens, since all are more than 100 millims. in length:—

Table I.

Specimen.	Length of specimen.	Length of ambulacra.		Breadth of anal plastron.	No. of interambulacral angles.		Locality.
		Anterior.	Posterior.				
	millim.	millim.	millim.	millim.	l.	r.	
1....	117	40, 40	43, 43	37	1	1	
2....	120	35, 33	36, 34	30	2	2	Naples.
3....	116	34, 34	38, 38	31	1	1	Naples.
4....	116	32, 32	36, 36	29	2	2	Naples.
5....	116	33, 33	35, 36.5	28.5	2	2	
6....	109	39, 39	41, 39	31	1	2	Samoa.
7....	106	32, 32	32, 32	29	1	2	
8....	115	34, 34	36.5, 35	29.5	2	2	Naples.
9....	118	38, 38	40, 40	31	2	2	

In the next Table is given the proportions of five specimens from one locality, Naples; and it will fitly lead to the series of smaller forms.

Table II.

Specimen.	Length.	Length of ambulacra.		Breadth of anal plastron.	No. of inter-ambulacral angles.	Proportion of length of anterior to posterior ambulacra.
		Anterior.	Posterior.			
	millim.	millim.	millim.	millim.	l. r.	
1...	132	42, 41	42, 42	37	2 2	1000 to 1000.
2...	120	35, 33	36, 34	30	2 2	1000 to 1028.
3...	116	34, 34	38, 38	31	1 1	1000 to 1107.
4...	115	34, 34	36.5, 35	29.5	2 2	1000 to 1073.
5...	71	21, 21.5	26, 27	22	1 1	1000 to 1238.

The differences in the length of the ambulacra observed in the last specimen seem to point to this character, so far as it is one, being variable with age.

In the following Table four smaller specimens are compared, and seem to support this supposition :—

Table III.

The first two of these specimens were undoubtedly regarded by Dr. Gray as belonging to the species *carinatus*.

Specimen.	Length.	Length of ambulacra.		Breadth of anal plastron.	No. of inter-ambulacral angles.	Proportion of length of anterior to posterior ambulacra.
		Anterior.	Posterior.			
	millim.	millim.	millim.	millim.	l. r.	
1...	84	27, 27	31, 31	25	1 2	1000 to 1144.
2...	66	20, 20	23, 23	17	1 1	1000 to 1150.
3...	55	17, 16	21, 21	21	1 1	1000 to 1234.
4...	39.5	12, 12	15, 15	14	1 2	1000 to 1250.

From these two tables we may perhaps draw the following conclusions :—(1) In specimens of *Brissus* longer than 100 millims., the proportion of the anterior to posterior ambulacra may be from  $\frac{1000}{1000}$  to  $\frac{1000}{1107}$ . (2) In specimens less than 100 millims. long the same parts may be to one another in the proportions from  $\frac{1000}{1144}$  to  $\frac{1000}{1250}$ .

If, then, the characters above detailed are of no value or assistance in the discrimination of the species, we are led to ask what importance is to be attached to the possession of a keeled posterior interambulacrum? its absence in young forms, its variability in older ones, and the littoral habitat of its possessors points rather to its being a character acquired by the individual itself than by the individual from its ancestors. In other words, the variations in carination seem to be such as are compatible with the general characters of the species; it is a ready instance of the difficulty of discriminating between mere varia-

<sup>1</sup> Verrill's measurements of his species *B. obesus* bear out this conclusion; his largest specimen measured 2 inches, the anterior ambulacra .65, and the posterior .80, giving thus a proportion of  $\frac{1250}{1000}$  (and not, as by some curious slip, Verrill states of  $\frac{1}{10}$  [ $\frac{1000}{1250}$ ]).

tion within the limits allowed by inheritance, and the development of useful variations into fixed and definite differences. The only criteria which we can apply to problems of this character seem to be the observation (1) of what obtains in allied forms, and (2) of what obtains in forms living under somewhat similar conditions. The variations which appear to occur in *Metalia sternalis* during growth, and the varieties of *Diadema setosum*, are to be cited as supporting examples of the first, as are the *Calcispongiæ* of the second of these criteria. The well-marked keel of some specimens of *B. carinatus* seems, then, to be the combined result of variability and of littoral existence; in other words, the species *carinatus* is not a good one, its sole character, the keel, not being a constant attribute of its organization, but a point which has been seized upon by a descriptive naturalist unacquainted from lack of material with both its history and its variations.

It now remains to settle which of the numerous names given to this species should be adopted. In commencing the systematic study of the Echini I hoped to find in the synonymy of Agassiz sufficient evidence of care to enable future workers "to simplify their work by getting rid, to a great extent at least, of the *bête noire* of zoologists, and apply their time to better things." For the British naturalist, unfortunately, Prof. Agassiz's method of nomenclature prevents this desirable result; nor does he, in his reference to pre-Linnæan authors, preserve his consistency: his 'Chronological List,' for example, ascribes the name *Brissus* to Aristotle, but his synonymy to Klein (1734), while *Echinus* falls to the Greek naturalist and to Rondeletius (1554). This difficulty might, however, be pretty easily eliminated; but the omission of synonyms is a more serious matter in a work of such pretensions: thus, in the synonymy of *B. unicolor* we find a reference to *B. ovatus*, Gmelin (1788), but no reference to the preceding species in Gmelin's list, which is *B. unicolor* itself, as is quite distinctly shown by the reference of both Gmelin and Agassiz to pl. xxvi. of Klein's 'Dispositio Echinodermatum.' The date of the specific term *unicolor* being then 1788, what is the date of *carinatus*? Agassiz, in his synonymy, ascribes it to Lamarck, and so places it in 1816; but a second reference to Gmelin shows that he recognized this species, his typographical error of 43 for 48 being corrected by his own reference to p. 249 of Klein's (or rather Leske's) work, where the variety is spoken of as *late-carinatus*. I propose, therefore, to retain the name *unicolor*.

Passing from the question of the identity of the species *B. unicolor* and *B. carinatus*, I come to the consideration of the forms *Meoma* and *Metalia*, which are reckoned as subgenera of *Brissus* by Prof. Alex. Agassiz. Under *Meoma* two species are included, one of which is found on either side the Isthmus of Panama—*M. grandis* and *M. ventricosa*. Whether a larger series than the Museum possesses at present will enable us to show the specific identity of these forms I do not know. The coarser and more distant tuberculation of *M. grandis* affords, as Agassiz has remarked, a ready mark of distinction; and it seems, from a comparison of the arrangement of the



tubercles in different species, to be a character of value. Thus, in *M. grandis* there are large and distant tubercles, not only within the peripetalous fasciole and in the anterior ambulacra, but also over very nearly the whole of the actinal surface. In *M. ventricosa* the large tubercles on the abactinal surface are much rarer, and there are, especially along the ambitus, smaller and more closely packed tubercles; the larger and more distant tubercles are confined more to the anterior end of the actinal surface than they are in *M. grandis*. In *Brissus* the large and distant tubercles are completely absent from the posterior end of the abactinal surface, while on the same surface in *Metalia* the large tubercles are confined within the peripetalous fasciole; and, further, in *Metalia sternalis* they only occupy the margins of the interambulacra.

The example of *M. ventricosa* in the Museum collection is particularly fine. Though obtained in April 1847, it does not figure in Dr. Gray's Catalogue (1855). It was registered under the name of *Amphidetes* (sic) *gigas*, and is reported to have come from Brazil. I found some difficulty in determining it until I lit on the elegant diagnosis given by Prof. Grube of *Brissus panis*<sup>1</sup>. As to the identity of the British-Museum specimen with *B. panis* of Grube I have no doubt; the subjoined details will show some points of resemblance. I add some measurements of *Meoma grandis*:—

	<i>Meoma ventricosa.</i> (B.M.)	<i>Brissus panis.</i> (Grube.)	<i>M. grandis.</i> (Gray's type.)
	millim.	millim.	millim.
Long axis . . . . .	177·5	162 (= 6 German inches)	115
Transverse axis . . . . .	152	135 (= 5 G. i.)	103
Height . . . . .	82	81 (= 3 G. i.)	51
Anterior pair ambulacra	80·80	.. ..	51·53
Posterior „ „	91·88	.. ..	59·60
Length of anal system	21	.. ..	17·5
Breadth „ „	17	.. ..	15

I am not inclined to dispute Lütken's view of the identity of Grube's species with *Meoma ventricosa*, Lamarck. The number of spines preserved on the specimen is fairly good; of those on the abactinal surface I found the greatest length to be about 8 millims.; but I measured one on the actinal surface which reached 12 millims. (Grube's longest spine measured 3 lines). The spines on the ambulacra are somewhat longer and thicker than those on the interambulacra, and are so set horizontally as to bridge over the ambulacral grooves; they are in all cases of a whitish colour, and are not produced into sharp points. The madreporic plate is not less porous than in *M. grandis*. Grube had no information of the locality of his specimen; the most southern locality given by Agassiz is Honduras.

<sup>1</sup> Grube: "Diagnosen einiger neuen Echinodermen," Arch. f. Nat. 1857, pp. 340-344; "Beschreibungen neuer oder weniger bekannten Seesterne und Scigel," Nova Acta, tom. xxvii. (Jena, 1860).

Before discussing the relation which *Meoma* and *Brissus* hold to one another, it is necessary to refer to the subgenus *Metalia*, under which are included the four species *africana* (Verrill), *maculosa* (Gmelin), *pectoralis* (Lamk.), and *sternalis* (Lamk.).

Of this last-named species there are in the possession of the Museum three examples bearing Dr. Gray's label of *Brissus sternalis*. Two of them are injured, and are apparently the specimens *a* and *c* of Gray's Catalogue; they are about 160 millims. long, and have the vertex considerably elevated. The third specimen, which is well provided with spines, is not more than 100 millims. long; and no part of the abactinal surface is raised above the general level. Prof. Agassiz (p. 145) credits the Museum with specimens from Raine's Inlet, Port Essington, Reef Attagor, Luzon, and Osmaga (*sic*); all these, with the exception of that from Luzon, are young examples of *Brissus unicolor*. The Luzon example seems, however, to belong to *Metalia*, and may well be the young of *M. sternalis*; were it not for the third of Gray's specimens above mentioned it would be impossible to connect this young form with the large examples. Those in the possession of the Museum incline me to accept Agassiz's account of the changes in this species during growth; but an anxious look-out must be kept for fresh specimens; none have yet been received from the collections made by the 'Challenger' Expedition.

Agassiz distinguishes *Metalia* as a subgenus thus:—"The subgenera *Plagionotus* and *Metalia* are united as a single subgenus of *Brissus* (*Metalia*), the slight difference in the course of the peripetalous fasciole and the presence of larger tubercles not being sufficient ground, with our present knowledge of the changes due to growth, to warrant retaining them both; and as *Plagionotus* is already in use among Coleoptera, the subgenus proposed by Gray has been adopted and amended to include *Brissidæ* having a more or less broad, elliptical, or undulating re-entering peripetalous fasciole, and an anterior ambulacral groove." I fear I must take exception to this lucid diagnosis; not only is the odd anterior ambulacrum of *M. maculosa* said (p. 599) to be "flush with the test, except towards the ambitus, as it approaches the fasciole, and below it when it is placed in a slight indentation of the test," but a comparison of the "deep" groove of *M. sternalis* with the slight groove of *M. maculosa* and *M. pectoralis* on the one hand, and on the other a comparison of the anterior ambulacrum in *Brissus* and *Meoma*, in which at times there are slight indications of depressions, will be sufficient to show that this character is not of more than specific importance, at any rate. I have, indeed, some hopes of showing that this depression of the anterior ambulacrum is a characteristic of the more lately developed forms; but for the present I must be content to remark that in the *Brissine* series it is only found in forms which, by the elaborate character of their subanal fasciole, indicate their later appearance.

This subanal fasciole displays the following arrangements:—In *Meoma* it is a narrow band, which does not extend beyond the ac-

and subequal, the 6th longer than the 7th, which about equals the 2nd. The tarsi are about as long as the bill, rather slender, and covered with 6-7 scales in front, the lower ones being the smallest and transverse. The 2nd and 4th toes are very slender, about equal in length, and shorter than the 3rd. The hallux is unusually stout for the size of the bird. The tail has 12 feathers, is short, and nearly square.

Most of the species have more or less red in their plumage; but this colour is altogether absent in some, and becomes only a slight tint, confined to the margins of the feathers, particularly of the head, wings, and tail, in others. As yet our knowledge of the phases and changes of plumage is by no means perfect. In one group (e. g. in *M. sanguinolenta* and its allies, including *M. nigrita*) the females seem to retain throughout life the brown plumage of immaturity, whilst in others (e. g. *M. nigriventris*, *obscura*, &c.) the adults of each sex are similar. In most cases the first plumage seems to be nearly uniform brown, lighter beneath, with the wing-coverts lighter at the edges, and the quills margined externally with olive-yellow. Throughout the group there is seen a great tendency to retain these markings on the wings, as likewise a white margin on the inner web of the primaries.

The eggs seem to be generally whitish or buff, spotted with darker, red or yellow. According to Gilbert (Gould, Handb. B. A. i. p. 558) *M. nigra*, like many other species of Meliphagidæ, lays only two eggs. The nests are small and cup-shaped, rather flimsily constructed of grass-stems, hair, spiders' webs, &c., and often placed in the fork of a tree or bush.

In their habits the *Myzomelæ* seem to resemble the other smaller Honeysuckers, frequenting flowering shrubs and trees, not apparently so much for the sake of the nectar of the flowers, as for the insects attracted thereby.

But one or two species of this genus, which is perhaps most nearly allied to *Acanthorhynchus*, but distinguishable by its longer beak and different coloration, were known to the older authors. Bonaparte, in his 'Conspectus' (p. 394, 1850), enumerates 9, one of which, however (*Certhia sanguinea*, Gmel.), is a *Drepanis*, whilst *M. eques* is omitted. Gray (Hand-l. B. i. p. 153, 1869) gives 17, though here again *M. eques* is omitted, being included as "*Cosmeteira eques*" amongst the Nectariniidæ (no. 1337). In the present paper 26 species, including two new ones, are recognized as distinct, besides one other which remains doubtful. Of these 26 species, 24 are known to me autoptically. Of the two which I have not seen, one (*M. lafargii*) is unique in the Paris Museum, the other (*M. rubro-tincta*) has lately been described from specimens at Leyden by Count Salvadori.

The collection in the British Museum, that made by the 'Challenger,' and the specimens in the collections of Mr. Sclater and Messrs. Salvin and Godman have formed the basis of my present paper. In addition to these I have to thank Canon Tristram, F.R.S., Dr. A. B. Meyer, and Count Salvadori for the very liberal way in which they have lent me valuable series of specimens. To the two

latter, in particular, I am indebted for sending over to me the types of the species described by them from New Guinea and its islands, and several others which I should not otherwise have been able to examine, and for their kind permission to figure any of them. Count Salvadori, too, has sent me some very valuable notes as to the range &c. of the Papuan species; whilst to M. Oustalet I am much obliged for information on the type specimen of *M. lafargii* and on some other points.

The following table will assist in the determination of the 26 valid species. It, however, only holds good for adult birds, and in many cases only for the males, our present imperfect knowledge of many of the species making a table that would have included all stages alike an impossibility.

A. Corpore rubro ornato, aut unicolori.

a. Corpore subtitis plus minusve olivaceo-griseo aut albicante.

a. Fronte coccineâ.

b. Torque pectorali nullo.

c. Capite et dorso concoloribus.

{ Alis fusco-nigris; abdomine flavido-griseo...	{ 1. <i>sanguinolenta</i> .
{ Alis olivaceo-fuscis; abdomine griseo-flavido	{ 2. <i>caledonica</i> .
	3. <i>chloptera</i> .

d. Capite rubro; dorso fusco ..... 4. *adolphina*.

b'. Torque pectorali fusco.

{ Abdomine albicante ..... 5. *boiei*.

{ Abdomine fusco-griseo ..... 6. *erythrocephala*.

a'. Fronte nigrâ.

d. Capite suprâ maculâ rubrâ ornato.

e. Gulâ rubrâ.

{ Gutturæ summo nigricante ..... 7. *vulnerata*.

{ Gutturæ croceo-flavo ..... 8. *jugalensis*.

e'. Gulâ nigrâ ..... 9. *lafargii*.

d'. Capite suprâ omnino nigricante ..... 10. *scelerati*.

β. Corpore subtitis dorso concolori.

a. Corpore nigro.

{ Subalaribus albis ..... 11. *nigrita*.

{ Subalaribus nigris ..... 12. *pammehana*.

a'. Corpore griseo-brunneo.

b. Striâ gulari coccineâ ..... 13. *eques*.

b'. Striâ gulari nullâ.

{ Capite solùm rubro tincto ..... 14. *obscura*.

{ Alis et caudâ rubro tinctis ..... 15. *simplex*.

{ Corpore, alis et caudâ rubro tinctis ..... { 16. *rubrotincta*.

{ 17. *rubro-brunnea*.

a". Corpore rubro ..... 18. *erectata*.

γ. Corpore subtitis nigro et rubro vario.

a. Gulâ coccineâ.

b. Capite toto coccineo.

c. Abdomine rubro; crisso nigro ..... 19. *rubratra*.

c'. Abdomine et crisso nigris.

d. Pectore coccineo ..... { 20. *nigriiventris*.

{ 21. *cardinalis*.

d'. Pectore nigro ..... 22. *lifuensis*.

b'. Capite suprâ nigro ..... 23. *chermesina*.

a'. Capite toto nigro ..... 24. *rosenbergi*.

B. Corpore nigro alboque vario.

{ Gulâ uropygioque nigris ..... 25. *nigra*.

{ Gulâ uropygioque albis ..... 26. *pectoralis*.

## I. MYZOMELA SANGUINOLENTA.

? *Scarlet Creeper*, Lath. Gen. Syn. i. pt. 2, p. 740 (1782).

? *Certhia rubra*, Gmel. S. N. i. p. 479 (1788).

*Sanguineous Creeper*, Lath. Gen. Syn. Suppl. ii. p. 167, t. 130 (1801).

*Certhia sanguinolenta*, Lath. Ind. Orn. Suppl. p. xxxvii (1801).

*Cochineal Creeper*, Lath. Gen. Syn. Suppl. ii. p. 167 (1801).

*Certhia dibapha*, Lath. Ind. Orn. Suppl. p. xxxvii (1801).

*Red-rumped Creeper*, Lath. Gen. Syn. Suppl. ii. p. 169 (1801).

*Certhia erythropygia*, Lath. Ind. Orn. Suppl. p. xxxviii (1801).

*Certhia australasiæ*, Leach, Zool. Misc. i. p. 30, t. 11 (1814).

*Myzomela cardinalis*, V. & H. (nec Gm.), Linn. Trans. xv. p. 316 (1826).

*Myzomela sanguinolenta*, Gld. B. A. iv. pl. 63; id. Handb. B. A. i. p. 555.

♂ ad. *capite, dorso cum uropygio, pectore et lateribus abdominis coccineis; macula anteoculari, alis caudaque nigris; alarum tectricibus conspicue albido, remigibus olivaceo-griseo limbatis; abdomine sordide flavido; subcaudalibus griseo alboque variis; rostro nigro, pedibus corneis. Long. al. 2.4, caud. 1.6, rostr. 0.45, tars. 0.5 (poll. Angl.).*

♀ *sordide griseo-brunnea, subtus dilutior; dorso et uropygio rufescenti tinctis; alis caudaque fuscis, remigibus olivaceo, tectricibus alarum pallide brunneo marginatis.*

*Hab. in Australiâ.*

The phases of plumage in this species, the type of the genus (for *M. cardinalis*, apud Vig. & Horsf. *l. s. c.*, is this bird), seem to have caused some confusion amongst the older authors. It seems to me that in all probability Latham's "*Scarlet Creeper*," on which Gmelin founded *Certhia rubra* in his edition of the '*Systema Naturæ*,' really applies to this species, the description "*lower part of belly and vent white*," together with the size ("*of a Wren*") and the locality ("*from some part of the South Seas*") quite coinciding with this bird, and not at all with *M. cardinalis*, of which, in his Ind. Orn. (i. p. 290, 1790), Latham treated it as being the female. Besides this, Latham bestowed at least three other Latin names (each with its equivalent vernacular) on this little bird.

*Myzomela sanguinolenta* is perhaps most nearly allied to *M. chloroptera*, which differs, however, as below pointed out. Only the males possess the beautiful red plumage; and in these, if not quite adult, the variegation of each breast-feather, which is grey at the base, then paler, and red only at the tip, produces the somewhat mottled appearance of the red underparts.

According to Mr. Gould, the irides are "*dark brown*."

*Myzomela sanguinolenta* is the commonest species of *Myzomela* in Australia, and is familiarly known to the colonists as the "*Little Soldier*." Mr. Ramsay, in his list of Australian Birds (Proc. Linn. Soc. N. S. W. ii. 1877), records it from Rockingham Bay, Port Denison, the Wide-Bay District, the Richmond- and Clarence-

River Districts, New S. Wales, the interior, Victoria, and S. Australia; so that it ranges over the greater part of Eastern Australia.

Mr. Ramsay has given us a good account of the habits and nesting of this species near Sydney, where it is a summer visitor, arriving in October and November, in 'The Ibis' for 1865 (p. 304).

## 2. MYZOMELA CALEDONICA, n. sp.

*Myzomela sanguinolenta* (ex Novâ Caledoniâ) auct.

♂ *præcedenti simillima, sed tectricibus alarum marginibus albidis carens.*

*Hab.* in Novâ Caledoniâ.

*Mus.* H. B. Tristram.

The *Myzomela* from New Caledonia, although no doubt very closely allied to the preceding Australian species, is, I think, fairly entitled to rank as a distinct species; and I have therefore separated it under the above name. My attention was first directed to this form by a specimen kindly lent me by Canon Tristram, and shot by Mr. Layard near Noumea. This bird, a fully-plumaged male, differs from a considerable number of Australian specimens with which I have compared it, in the almost entire absence of the conspicuous greyish-white margins to the feathers of the wing-coverts, so that they are nearly entirely black, with only a trace of olive-colour at the margins. Besides this, the red colour of the body is hardly so bright, and extends a little further down on the abdomen, and the margins to the quills are more of an olive-yellow. The size is about the same (wing 2·25), Australian specimens varying a little in this respect. Canon Tristram writes me that he has six specimens of the New-Caledonian bird, and that the differences which I pointed out to him are constant in the series. Mr. Layard gives the following notes as to the soft parts on the label of his specimen:—"Beak black, legs brown-black, iris brown."

Mr. Layard also met with a *Myzomela*, which he referred to *M. sanguinolenta* (Ibis, 1878, p. 280), in the New Hebrides, on the islands of Vatè, Api, and Mallikollo, and remarks that a specimen procured is identical with the New-Caledonian bird; so that it seems probable that *M. caledonica* may extend its range as far as these islands; but specimens to show this are as yet wanting.

## 3. MYZOMELA CHLOROPTERA. (Plate XXIV. fig. 1.)

*Myzomela chloroptera*, Wald. Ann. N. H. 4th ser. ix. p. 399 (1872); Salvad. Ann. Mus. Civ. Gen. vii. p. 662 (1875).

♂ ad. *capite, dorso uropygioque, cum pectore, coccineis; corpore subtus griseo-flavido; alis caudaque fuscis, remigibus et tectricibus alarum olivaceo limbatis, subalaribus et margine interna remigum albis, alæ flexura flavo-albida; macula anteoculari nigra; rostro nigricante, pedibus obscure corneis. Long. al. 2·2, caud. 1·5, rostr. ·55, tars. ·50 (poll. Angl.).*

*Hab.* in insulâ Celebes.

This *Myzomela*, the westernmost of the whole genus, was described by the late Lord Tweeddale from imperfect specimens collected by

Dr. Meyer at Menado, where it has also been obtained by Bruijn's collectors; and from one of these specimens, kindly lent me by Count Salvadori, the figure is taken. As yet, I believe, it has only occurred near Menado; and the young and female remain unknown, or at least undescribed.

*Myzomela chloroptera* resembles the Australian *M. sanguinolenta*, but is a smaller bird, and also differs in the smaller extent of the red on the chest, and in that colour being more intense, the abdomen yellower, and the wings and tail not so black. The black anteocular spot is less conspicuous.

In his original description Lord Tweeddale remarks that this bird nearly resembles plate 54 of the 'Oiseaux Dorés,' vol. ii., representing "L'Heorotaire écarlate" from the "South Seas," taken from a drawing of a bird in the Leverian Museum. The figure certainly corresponds very fairly with this species, but, from the locality given, is probably intended for the Australian one (*M. sanguinolenta*).

#### 4. MYZOMELA ADOLPHINÆ. (Plate XXIV. fig. 3.)

*Myzomela adolphinæ*, Salvad. Ann. Mus. Civ. Gen. vii. p. 946 (1875).

♂ *pallio, dorso superiore, alis caudaque olivaceo-fuscis, tectricibus alarum, remigibus et rectricibus externe subtiliter olivaceo limbatis; capite uropygioque coccineis; macula anteoculari nigra; corpore subtus flavido-albido, pectore grisescenti lavato; subalaribus et remigum margine interna albis; rostro nigricante, pedibus corneis. Long. tot. circa 3·5, al. 2·2, caud. 1·5, rostr. ·45, tars. ·5 (poll. Angl.).*

♀ *minor, feminae Myzomelæ boiei similis.*

*Hab.* in montibus Arfak.

This is one of the numerous discoveries of Beccari and Bruijn in the Arfak Mountains, and only a few specimens have as yet been obtained. Count Salvadori writes (*l. s. c.*):—"This species resembles *M. erythrocephala* of Gould, but differs from it in its much smaller dimensions, by the very slight olive tint of the back, and by the lower parts being not grey-brown, but whitish, very slightly tinged with yellowish on the breast and abdomen." The female resembles that of the Banda species (*M. boiei*), but differs as pointed out under that species (*vide infra*).

The figure (Pl. XXIV. fig. 3) represents an adult male, one of the types of this species, most obligingly lent me by Count Salvadori.

#### 5. MYZOMELA BOIEI.

*Myzomela boiei*, Sal. Müll. Verh., Land-én Volkenk. p. 172 (1839-44); id. Verh., Zool. Aves, p. 66, t. 10. figs. 1, 2.

♂ *capite, dorso uropygioque coccineis, plumis ad basin nigris; macula anteoculari, alis caudaque, cum torque pectorali nigris; corpore subtus griseo-albo; subalaribus et remigum margine interna albis; rostro nigro; pedibus corneis, plantis flavis. Long. al. 2·2, caud. 1·8, rostr. ·5, tarsi ·6 (poll. Angl.).*

♀ *minor, capite pectoreque sordide griseis olivaceo lavatis; dorso,*

*tetricibus alarum et uropygio brunneis; fronte anguste gulaque rubris; alis caudaque fuscis, pennis anguste flavido limbatis; abdomine et subcaudalibus flavo-albidis; rostro pedibusque corneis.*  
*Hab.* in insulâ Banda.

This species is confined to the island of Banda, where it is not uncommon, according to Müller, in the nutmeg-plantations. The male resembles *M. erythrocephala* (ex insulis Aru), but differs from it in the black and white colours being purer and more contrasted. The female is extremely like that of *M. adolphinae*, but is smaller, has the breast greyer, the forehead redder, and the yellowish-olive margins to the quills more conspicuous.

The iris is "brown" (S. Müller; Murray).

#### 6. MYZOMELA ERYTHROCEPHALA.

*Myzomela erythrocephala*, Gould, P. Z. S. 1839, p. 144; id. B. A. iv. pl. 64; id. Handb. B. A. i. p. 556 (nec Meyer, Sitzungsber. Wien. Akad. lxx. pp. 204-206).

♂ *capite, dorso inferiore et uropygio intense coccineis; pallio, dorso superiore, alis caudaque cum torque pectorali fuliginosis, remigibus subtilissime olivaceo limbatis; abdomine et subcaudalibus sordide olivaceo-griseis; subalaribus et margine interna remigum albis; macula anteoculari nigra; rostro nigricante, pedibus nigro-corneis. Long. tota circa 4.0, al. 2.4, caud. 1.75, rostr. .55, tars. .55 (poll. Angl.).*

*Hab.* in Australiâ septentrionali, insulis Aru, et Novâ Guineâ meridionali.

There is some doubt as to the exact range of this species, and as to whether one or more species have not been included by various writers under the same name. Unfortunately I have not been able to see a sufficient number of specimens to clear up the question, the solution of which must wait till a larger series from different parts becomes available for comparison.

*Myzomela erythrocephala* was first described by Mr. Gould from specimens from Port Essington, and was characterized as "*intense fusca, capite et uropygio coccineis.*" This description agrees well enough with the figures in his folio work, and with the skins in the British Museum from Aru collected by Wallace. In the text, however, as also in the 'Handbook,' the general colour of the plumage is described as "deep chocolate-brown," a term which can hardly be said to agree either with "*intense fusca*" or with the figures.

In one of his expeditions to Southern New Guinea, Signor D'Albertis obtained a single male (nearly or quite adult) of a *Myzomela* at Mon, Hall Bay, of which Count Salvadori, in the account of the collection (Ann. Mus. Civ. Gen. vii. p. 825, 1875), says that it in no way differs from one from Australia with which he has compared it, and further remarks that Gould's plate is inaccurate in representing the back &c. as almost black, instead of only slightly darker than the under surface. In a letter to me, however, he says that now he is "not quite satisfied as to this bird being the same as the Australian species; this and the Aru bird seem to me much



darker," and further proposes to separate it and the Aru form as a new species, *Myzomela infuscata*. But the bird from Mon, which Count Salvadori has most kindly lent me, differs from the Aru birds in its much lighter colours above, which are moderately dark greyish brown, not brownish black, and in the dark colour on the breast shading off more gradually into that of the flanks and abdomen, so that there is less appearance of a dark pectoral band. The anteocular spot is brown. The size is about the same as that of the bird described above (from a specimen in Mr. Godman's collection, collected by Cockerell, and agreeing with Wallace's Aru skin in the British Museum). Not having seen an authenticated adult Australian specimen, I cannot say whether the New-Guinea bird is or is not identical with that from Australia; but it certainly differs considerably from the Aru birds in colour. If on further investigation the Aru bird proves really distinct, it will have to stand as *Myzomela infuscata*, Salvad. in litt. On the other hand, if Mr. Gould's figure and description are correct, it would seem that the bird from Southern New Guinea is distinct. I have not seen the female of this species. Mr. Gould describes it as "uniform brown above, lighter beneath."<sup>1</sup> Count Salvadori describes the female of *M. infuscata* thus:—"Brunneo-grisea, subtus pallidior, fronte et gula late rubris; remigibus exterius subtiliter olivaceo-marginatis;" and this description closely agrees with a young male from the Aru Islands in the British Museum, in which, however, there are also some red feathers on the back.

Gould gives the irides as "reddish brown," D'Albertis as "black." In Australia, *Myzomela erythrocephala* is confined to the northern districts, having occurred at Port Essington (Gould), Port Darwin (Masters), and Cape York (Ramsay's list of Australian birds). It was included in Marie's list of New Caledonian birds (Ibis, 1877, p. 362), but is omitted by Verreaux and Desmurs, and Mr. Layard has as yet not found it. M. Oustalet, too, tells me that he has not seen it from the mainland of New Caledonia.

#### 7. MYZOMELA VULNERATA.

*Nectarinia (Myzomela) vulnerata*, Müll. Verh., Land- en Volk. p. 172 (1839-44); id. Verh., Zool. pl. 10. figs. 3, 4.

*Fusco-nigricans, capitis supra macula magna, gula et uropygio sanguineis; abdomine, subcaudalibus, subalaribus, et margine remigum interna albis; rostro nigro, pedibus plumbeis.* Long. al. 2.2, caud. 2, rostr. .5, tars. .53 (poll. Angl.).

*Hab.* in insulâ Timor.

This very distinct species is confined to the island of Timor. It is somewhat allied to *M. boiei* and *erythrocephala*, but is at once distinguished from both by the red on the head being confined to the vertex and throat, and by the much darker tint of that colour. The female is similar to the male, but smaller, with the colours less distinct. The irides are reddish brown (*Sal. Müller*).

<sup>1</sup> In the plate the forehead is shown as tinged with red.

## 8. MYZOMELA JUGULARIS.

*Myzomela jugularis*, Peale, U.S. Expl. Exped. p. 151, t. 41. f. 2 (1848); Cassin, U.S. Expl. Exped. p. 176, t. 12. f. 2 (jr.) (1858); H. & F. Orn. Centr.-Pol. p. 54, t. 7. figs. 1, 2 (ad. et jr.).

*Myzomela solitaria*, Hombr. & Jacq. Voy. Pôle Sud, Zool. iii. p. 99, Atlas, t. 22. f. 6 (1853).

Ad. *fusco-nigricans, subtus flavescenti-albida, mento, gula, macula-que magna occipitali cum uropygio coccineis; gutture croceo-flavo; remigibus, primis duobus exceptis, et tectricibus alarum majoribus flavido marginatis; rectricibus, duabus mediis exceptis, tectricibusque alae minoribus nonnullis ad apicem albis; rostro nigro, pedibus corneis. Long. al. 2.45, caud. 1.6, rostr. .6, tarsi .55 (poll. Angl.).*

Jr. *macula occipitali nulla, gutture sordide flavo, et uropygio brunneo-olivaceo distinguenda.*

*Hab. in insulis Vitiensibus.*

This *Myzomela* hardly admits of being mistaken for any other species. It is perhaps most nearly related to *M. lafargii* of the Solomon Islands, but is at once distinguishable from that species by the red throat and orange-yellow chest, besides other differences. The red of the throat is separated from the yellow of the chest by a distinct though narrow black line. The red on the back appears last, that on the chin first. In not fully plumaged birds the rump and lower back are olivaceous. The sexes when adult are nearly alike, the female being only distinguishable by the colours being less bright. Very often, too, though not always, the red occipital spot is absent in the female.

Mr. Murray records the iris as "black," Mr. Layard as "brown," the legs being "verditer" and "dark livid" in the living bird, with the soles of the feet yellow.

This bird is entirely confined to the Fijis, where, according to Mr. Layard's list (*Ibis*, 1876, p. 391), it is found in all the larger islands of that group<sup>1</sup>; and in addition to the islands enumerated by him, specimens from Matuku are in the British Museum (*Rayner*). Its occurrence in the Samoan group has not yet been confirmed (cf. *Whitmee*, *Ibis*, 1875, p. 447). Hombron & Jacquinot indicated their "*Myzomèle solitaire*" as being from the "Iles Salomon" with some doubt; and, relying on them, Mr. Sclater included "*M. solitaria*" in his list of Solomon-Island Birds (*P. Z. S.* 1869, p. 124), where, however, only *M. lafargii*, so far as is yet known, occurs.

## 9. MYZOMELA LAFARGII.

*Myzomela lafargei*, Hombr. & Jacq. Voy. Pôle Sud, Zool. iii. p. 98, t. 22. f. 5 (1853).

*Corpore supra cum capite, gutture et pectore superiore nigris; occipite coccineo; abdomine flavido-olivaceo; alis caudaque nigris,*

See also *P. Z. S.* 1875, p. 431, for an interesting account of its habits.

*remigibus olivaceo-limbatis, subalaribus albis; rostro nigro, pedibus plumbeis.*

*Hab.* in insulis Salomonis.

This species was obtained by the French Expedition to the South Pole; and the type specimen in the Paris Museum remains, I believe, unique in Europe. M. Oustalet, to whom I wrote for information about it, kindly replies to me, on comparing it with the figure in the Atlas to the 'Voyage':—"Je trouve dans celle-ci quelques inexactitudes. Les proportions de l'oiseau ont été un peu exagérées: le noir de la gorge a été trop étendu et trop marqué. L'oiseau type est plus petit, et il a le haut de la gorge seulement noir, le bas, vers la poitrine, étant un peu mêlé de jaune verdâtre."

*M. lafargii* is somewhat allied to *M. jugularis* of the Fijis, but differs from the latter in having the red confined to the top of the head, and in the throat and chest being black.

#### 10. MYZOMELA SCLATERI, sp. n. (Plate XXV. fig. 2.)

♂ *corpore supra, alis caudaque fusco-nigricantibus, capite saturatiore, plumis dorsì inferioris apice flavidis; remigibus, alarum tectricibus et rectricibus externe olivaceo-flavo limbatis; gula splendide coccinea; corpore subtus griseo-flavido, gutture sordidiore; subalaribus et margine interna remigum albis; rostro nigro, pedibus obscuris. Long. tot. circa 4·5, al. 3·65, caud. 1·7, rostr. ·6, tars. ·55 (poll. Angl.).*

*Hab.* in Novâ Britannîâ.

A few weeks ago Mr. Sclater, after whom I propose to name this new species, lent me for examination a single specimen of it, marked male, which he had recently received in a letter together with two *Pachycephalæ*, from the Rev. G. Brown, C.M.Z.S., of the Wesleyan Mission at present established on the Duke-of-York Islands. The exact locality given on the label is "Palaküru Island, New-Britain coast." I have not been able to find Palaküru Island on any map; but it is probably only an islet lying close to the shores of the larger island.

At first I had some doubts as to this individual being adult; but now, from the absence of red feathers on any other part, and from the singularly bright and shining colour of those on the throat, I have little doubt that it has very nearly or quite attained its full plumage. *Myzomela sclateri* hardly admits of being compared with any other species of the group, the entirely dark upperside and the red being confined to the throat rendering it quite unlike any species yet known to us.

#### 11. MYZOMELA NIGRITA.

*Myzomela nigrita*, G. R. Gray, P. Z. S. 1858, p. 173; Salvadori, P. Z. S. 1878, p. 97.

*Myzomela erythrocephala*, Meyer (nec Gould), Sitzungsber. Wien. Akad. lxx. p. 204 (1874).

*Myzomela meyeri*, Salvadori, Ann. Mus. Civ. Gen. vii. p. 947 (1875).

♂ *nitenti-niger, subalaribus et remigum margine interna albis; rostro nigro, pedibus corneis.*

♀ *griseo-brunnea, subtus dilutior; fronte gulaque rubro lavatis; remigibus externe olivaceis.*

*Hab.* in Novâ Guineâ occidentali et insulis vicinis.

This *Myzomela*, conspicuous for the almost entirely black plumage of the adult male, was first described by the late Mr. Gray from specimens collected in the Aru Islands by Wallace, where it was obtained again during the recent voyage of the 'Challenger.' It also occurs on the mainland of the north-western peninsula of New Guinea, at Dorey (*Wallace*) and Rubi (*Meyer*), and in the islands of Jobi and Miosnom (*Meyer* and *Beccari*), the birds from the mainland and these islands being considerably bigger than those from Aru. This is particularly the case with those from Jobi and Miosnom, so that Count Salvadori is inclined to separate them as a new species. But, as the following table will show, considerable differences in the measurements of this species occur in various localities; so that at present I consider it better to retain all forms under one name.

	Wing.	Tail.	Beak (from fore- head).	Tarsi.	
1. ♂. Aru? .....	2.2	1.65	.55	.5	
2. ♂. Wokan .....	2.4	1.65	.55	.5	
3. ♂. Aru .....	2.35	1.7	—	.5	
4. ♂. Rubi .....	2.5	2.0	.65	.5	
5. ♂. Dorey .....	2.4	1.8	.65	—	
6. ♂. Miosnom .....	2.7	2.0	.65	.5	} " <i>M. pluto</i> ," Salvadori, in litt.
7. ♂. Jobi .....	2.5	2.0	.67	.5	
8. ♂ jr. Miosnom ....	2.6	1.7	.67	.53	
9. ♂ jr. Rubi .....	2.3	1.8	.6	.53	
10. ♂ jr. Rubi .....	2.3	1.8	.58	.5	
11. ♀. Rubi .....	2.1	1.65	.55	.45	
12. ♀. Aru? .....	2.1	1.4	.55	.45	

The male of this species resembles that of *Myzomela pammelaena* from the Admiralty Islands, but differs as below specified. The female retains more of the normal colouring of the group, and approaches those of *M. boiei* and *M. adolphinae*. The young birds resemble the female, the red on the head in the young males being obtained before any indication of the black plumage. Dr. Meyer obtained only females and young of this bird, and referred these with considerable hesitation to *M. erythrocephala* of Gould, a very different species. Count Salvadori saw that this was a mistake, and proposed the name *meyeri* for the specimens collected by Dr. Meyer. But on subsequently examining the birds at Dresden, he found that in reality they were the young and females of the present species, the female having been only briefly indicated in Gray's original description.

Mr. Murray notes of a male from Wokan, Aru Islands, that the eyes are "hazel," the "bill and feet black."

## 12. MYZOMELA PAMMELANA.

*Myzomela pammelana*, Sclat. P. Z. S. 1877, p. 553.

♂ ad. *nigerrimus*, *remigum marginibus internis cineraceo-albidis*, *rostro pedibusque nigris*. Long. tot. circa 5, al. 2.7, caud. 2, rostr. .65, tarsi. .65 (poll. Angl.)

Jun. *præcedenti similis*, sed *omnino sordidior*, *abdomine et sub-caudalibus rufo-tinctis*, et *subalaribus albis distincta*.

*Hab.* in insulis Admiralitatis.

Two specimens, an adult male and a young bird, of this *Myzomela* were obtained during the stay of the 'Challenger' at Nares Harbour, Admiralty Islands. It is closely allied to *Myzomela nigrata* of the Aru Islands and New Guinea; but the adult male of the new species differs from the more western one by its *black* under wing-coverts (although these are *white* in the young bird), dirty white margins to the remiges, and longer and stouter feet and tarsi. In size it exceeds any specimens I have seen of *M. nigrata* from the Aru Islands, but is equalled in length of wing and tail by the larger birds from the islands and shores of Geelvink Bay.

Mr. Murray marks the irides of the adult bird as "hazel-brown."

## 13. MYZOMELA EQUES.

*Cinnyris eques*, Less. Voy. Coq. p. 679, t. 31. fig. 1 (1826).

*Nectarinia eques*, Müll. & Schleg. Verhand. p. 62 (1839-1844).

*Cosmeteira eques*, Meyer, Sitzungsber. Wien. Akad. lxx. pp. 215-217 (1874).

*Cosmeteira minima*, Wald. Ibis, 1870, p. 50 (♀).

*Omnino cinerascens-brunnea*, *subtus dilutior*; *stria gulari nitide coccinea*; *rostro pedibusque nigro-corneis*. Long. al. 3, caud. 2.5, tarsi .6 (poll. Angl.). (♂ ex Novâ Guineâ.)

*Hab.* in Novâ Guineâ et insulis vicinis.

Although generally placed amongst the Nectariniidæ, this species in structure and coloration is a true *Myzomela*, allied to the Australian *M. obscura*, from which it is at once distinguished by its bright red gular streak. The sexes are similar; but the females are considerably smaller than the males; and on one of these from Mysol the late Lord Tweeddale founded his species *C. minima*.

Dr. Meyer describes (*l. s. c.*) the young as having the forehead and top of the head tinged with reddish—an interesting fact, as showing in the young bird a style of coloration not retained in the adult, but occurring in other members of the genus, and therefore probably a more primitive character.

This species is widely distributed over New Guinea, occurring at Dorey (*Wallace* and *Meyer*), Rubi, Passim (*Meyer*), Sorong (*Mus. Lugd.*, fide *Salvadori*), and Wa Samson (*Beccari*); and D'Albertis found it on the Fly River. It also occurs in Waigiou (*Lesson*, *Wallace*, and *Bernstein*) and Myso (*Wallace* and *Hoedt*). Count *Salvadori*

has lent me specimens from Salwatti, and says that in the Leyden Museum there is one said to be from Ceram (*Moens*), but that this locality, as well as Gilolo (*Forsten*), are in all probability errors.

#### 14. MYZOMELA OBSCURA.

*Myzomela obscura*, Gould, P. Z. S. 1842, p. 136; id. B. A. iv. pl. 67; id. Handb. i. p. 559.

*Ptilotis fumata*, "Müll. Mus. Lugd., ex Nova Guinea," Bp. Consp. i. p. 392 (1850).

*Omnino griseo-brunnea, subtus pallidior, capite vinaceo tincto; remigibus externe subtilissime griseo limbatis; alis caudaque subtus griseis, remigum margine interna albida; rostro pedibusque nigro-corneis. Long. al. 2.7, caud. 2.2, rostr. .6, tars. .6 (poll. Angl.).*

*Hab.* in Australiâ septentrionali et Novâ Guineâ.

This plainly-coloured Honey-eater was first described by Mr. Gould from specimens obtained at Port Essington by Gilbert. It seems to have rather a wide range over the northern parts of Australia, occurring at Port Darwin (*Masters*), Cape York ('*Challenger*'), and in the north of Queensland "as far south as the Mary river" (*Ramsay*). D'Albertis found it at Naiabui and on the Fly River; and there are specimens from the river Utanata in the Leyden Museum—the originals of Bonaparte's "*Ptilotis fumata*" (cf. Salvadori, Ann. Mus. Civ. Gen. xii. p. 334, 1878).

The sexes are similar. I have not seen young birds.

The iris has been variously recorded as "red" (*Gould*), "brown" (*Murray*), and "black" (*D'Albertis*).

#### 15. MYZOMELA SIMPLEX.

*Myzomela simplex*, G. R. Gray, P. Z. S. 1860, p. 349.

*Sordide griseo-brunnea, subtus dilutior; remigibus et rectricibus rubido limbatis; margine interna remigum albida; rostro pedibusque corneis, his pallidioribus. Long. tot. 5.2, al. 2.3, caud. 2, rostr. .5, tarsi .6 (poll. Angl.).*

*Hab.* in Halmaherâ et insulis adjacentibus.

This plainly-coloured *Myzomela* was first discovered by Wallace in the island of Batchian, and it also occurs in most of the other islands of the Halmahera group of the Moluccas, but is replaced on Obi by the nearly allied *Myzomela rubrotincta*. Count Salvadori informs me that he has seen "many specimens in the Leyden Museum from Gilolo (*Bernstein*), Tidore (*Bernstein, Von Rosenberg*), and Dammar (*Bernstein*). A specimen from Ternate (*Bruijn*) is in Turati's collection. A single specimen from Morty in the Museum of Leyden is much darker than the others."

This species is allied to *M. rubrobrunnea* and *M. rubrotincta*, but differs from them in the less extent of the red colour, which is confined to the margins of the quills and tail-feathers. The sexes are probably similar in colour; I have not seen the young bird.

## 16. MYZOMELA RUBROTINCTA.

*Myzomela rubrotincta*, Salvad. Ann. Mus. Civ. Genov. xii. p. 344 (1878).

"*Brunnea, dorso, alis et cauda pulcherrime rubro tinctis; pectore, abdomine et subcaudalibus obsoletius rubro tinctis. Long. tot. 120 m., alæ .067, caud. .048, rostri .020, tars. .020.*"

*Hab.* "in ins. Obi (Bernstein)," Salvad. l. c.

This species has recently been described by Count Salvadori from five specimens—two males and three females—the two sexes are similar—in the Leyden Museum. He says it "resembles *M. simplex* of Gray from Halmahera, in which only the remiges and rectrices (and not all the parts between the head and neck) are margined with red, and in which the red colour is very indistinct."

## 17. MYZOMELA RUBROBRUNNEA. (Plate XXIV. fig. 2.)

*Myzomela rubrobrunnea*, Meyer, Sitzungsber. Ak. in Wien, lxx. p. 203 (1874).

♂ *grisescenti-brunneus, subtus dilutior, capite saturatiore, plumis plus minusve vinaceo limbatis; dorso inferiore et uropygio, cum marginibus externis remigum et rectricum vinaceo-rubris; alis caudâque subtus griseis; margine internu remigum albida; rostro pedibusque nigro-corneis. Long. tota circa 4, alæ 2.4, caud. 1.8, rostr. .6, tars. .55 (poll. Angl.).*

♀ *mari similis, sed coloribus minus intensis et paullo minor.*

*Hab.* in insulâ Mysore.

Dr. Meyer first discovered this beautiful species of *Myzomela*, during his travels in and about New Guinea in 1873. He obtained only two specimens, both males, at Kordo, the chief settlement in the island of Mysore in Geelvink Bay. Beccari obtained others in the same island, to which it is apparently confined; and from one of his specimens, a fine male, kindly lent me by Count Salvadori, the figure is taken.

This species resembles *M. simplex* and *M. rubrotincta* of the Moluccas, but differs from both in the red margins to the feathers being continued over a larger part of the bird.

## 18. MYZOMELA CRUENTATA.

*Myzomela cruentata*, Meyer, Sitzungsber. Ak. Wien, lxx. i. p. 202 (1874); Gould, B. New Guin. pl. pt. v.

*Myzomela coccinea*, Ramsay, Proc. L. S. N. S. W. ii. p. 106 (1877)? (Ex insulis Ducis Eboraci.)

*Myzomela erythrina*, Ramsay, Proc. L. S. N. S. W. ii. p. 107 (1877)? (Ex Novâ Hiberniâ.)

♂ *corpore omnino chermesino, uropygio splendidiore, plumis ad basin nigris; alis rubricantibus, plumis externe rubris; remigibus fuscis, primis duobus exceptis, rubro limbatis; rectricibus rubido-griseis, externe rubro marginatis; alis caudâque subtus*

*griseis*; *rostro pedibusque nigris*. Long. tot. circa 4, al. 2·2, caud. 1·5, rostr. ·55, tars. ·5 (poll. Angl.)

*Hab.* in montibus Arfak Novæ Guineæ.

This very beautiful *Myzomela*, at once distinguished from all others of this group yet described by its uniformly red colour, was first obtained by Dr. Meyer, in the Arfak Mountains in 1873. Only one specimen, an adult male, was procured; and this and another specimen, likewise a male and nearly or quite adult, procured by Bruijn's collectors in the same locality, and now in the Genoa Museum, are, I believe, the only examples yet brought to Europe of this splendid little bird.

A short time ago Mr. E. P. Ramsay, of the Sydney Museum, described two new species of *Myzomela*, both remarkable for their nearly uniform red coloration. One is indicated as a female and from the Duke-of-York Islands (*M. coccinea*); the other, a young male, (*M. erythrina*) is from New Ireland. Of it Mr. Ramsay says:—"This species is smaller than the preceding, and the bill is comparatively stronger and stouter; otherwise I should be inclined to consider it the young of the former." From his description it is evidently a young bird; and after having carefully compared both it and that of the other species with Dr. Meyer's and Count Salvadori's specimens, I have come to the conclusion that both *M. coccinea* and *erythrina* are probably referable to *M. cruentata*. If this is so, it would seem, provided Ramsay's specimens are correctly sexed, that the adults of this species are nearly or quite similar in coloration. The species probably has a wide range through New Guinea eastward of the Arfak Mountains.

#### 19. MYZOMEZA RUBRATRA.

*Cinnyris rubrater*, Less. Voy. Coquille, Zool. p. 678 (1826); id. Man. ii. p. 55 (1828); Kittlitz, Kupf. Vög. t. 8. fig. 1 (1832).

*Myzomela rubratra*, Bp. C. R. xxxviii. p. 263, 1854; Hartl. P. Z. S. 1868, p. 5; Hartl. & Finsch, P. Z. S. 1872, p. 94; Finsch, Journ. God. Mus. xii. p. 26 (1876).

*Myzomela major*, Bp. C. R. xxxviii. p. 263 (1854). (Ins. Carol.)

*Myzomela sanguinolenta*, pt., Gray (nec Lath.), Gen. B. i. p. 118; Bp. Consp. i. p. 394 (1850).

Ad. *coccinea*, *alis*, *cauda*, *crisso et subcaudalibus nigricantibus*; *alis caudaque subtus griseis*, *remigum margine interna albida*; *rostro nigricante*, *pedibus corneis*. Long. al. 2·95, caud. 2·3, rostr. ·65, tars. ·75, (poll. Angl.).

Jr. *olivaceo-brunnea*, *remigibus externe olivaceis*; *subalaribus obscuris*.

*Hab.* in insulis Pelewensibus, Marianis, et Carolinis.

This species belongs to the group of *M. cardinalis*, *nigriventris*, and *chermesina*, but is at once distinguished from all of these by the greater extent of the red colour in the adult, only the vent and under tail-coverts being black.

*Myzomela major* was founded by Bonaparte on specimens of this bird from the Caroline Islands, and characterized as "*Similis M.*



*rubratra*, *sed major et peroccinea*." But any such difference in size is not constant, and Dr. Hartlaub says (*l. c.*) that Pelew birds are as large as Caroline ones.

The young bird is nearly uniformly dark olive-brown, and gradually attains its full plumage by the gradual appearance of the red on various parts of its body.

*M. rubratra* is remarkable for its wide range over the archipelagos of the North-eastern Pacific. Lesson found it on the island of Ualan in the east of the Caroline group (his assertion that it was also found in the Philippines by M. Dussumier being of course erroneous), as did Kittlitz, who gives an interesting account of the habits of this species as observed by him on this island and the Marianne Island of Guam (Denkwürd. ein. Reise, i. pp. 364 and 381, 1858). Kubary found it on Ponapè in the east, and on Yap and the Mackenzie Islands in the west, of the Carolines; so that it is probably found all over that archipelago. Specimens from these islands are in the Godeffroy Museum; likewise examples from the Pelews (or Palaos). Gray, in his Catalogue of Pacific birds, gives "Island of Vanicoro" with a query; but in all probability this is a mistake, for as yet no *Myzomela* has been found there.

## 20. MYZOMELA NIGRIVENTRIS.

*Myzomela nigriventris*, Peale, U.S. Expl. Exped. p. 150, pl. 41. f. 2 (1848); Cassin, U.S. Expl. Exped. p. 175, pl. 12. f. i. (1858); H. & F. Orn. Centralpolyn. p. 56, t. 7. f. 3 and 4 (ad. and jr.).

*Myzomela rubratra* Hartl. (nec Lesson), Wiegman. Arch. 1852, p. 130 (ex Samoa).

*Myzomela cardinalis* Hartl. (nec Gmel.), Wiegman. Arch. 1852, p. 109.

"*Myzomela arnouxi*, Verr.," Bonaparte, C. R. xxxviii. p. 263 (1854).

Ad. *capite, dorso uropygioque cum pectore fulgido-coccineis, plumis ad basin nigris; corpore subtus, macula anteoculari, alis caudaque nigris; remigibus interne albidis; rostro pedibusque nigris. Long. al. 2.75, caud. 1.8, rostr. .65, tars. .7 (poll. Angl.).*

Jr. *olivaceo-fusca, subtus dilutior et flavido lavata; uropygio rubro tincto; remigibus olivaceo-limbatis; subalaribus et margine interna remigum albis.*

*Hab. in insulis Samoensibus.*

This species is very closely allied to *M. cardinalis*, which it replaces in the Samoa group. The differences between the two I have pointed out under the last-named species.

From *M. rubratra*, with which it was at first confounded, both these species differ in the black flanks and belly, these in *M. rubratra* being red, only the vent and under tail-coverts being black, whilst the red on the chest in all three of these species easily separates them from *M. lifuensis*.

*M. nigriventris* is confined to the Samoan Islands, its reported occurrence in the Fijis being erroneous (cf. Layard, Ibis, 1876, p. 391)

and founded on a mistake of Dr. Gräffe. It is apparently rather a common bird in the Samoan group, occurring both on Savaii and Upolu.

# 21. MYZOMELA CARDINALIS.

*Cardinal Creeper*, Lath. Gen. Syn. i. pt. 2, p. 733, pl. 33. f. 2 (1782).

*Certhia cardinalis*, Gm. S. N. i. p. 472 (1788); Lath. Ind. Orn. i. p. 290 (1790).

*Cardinal Honey-eater*, Lath. Nat. Hist. iv. p. 199, pl. 71. f. 2 (1822).

*Myzomela cardinalis*, Gray, B. Trop. Isl. p. 10 (1859); Tristram, Ibis, 1876, p. 261.

*Myzomela melanogastra*, Bp. C. R. xxxviii. p. 263 (1854).

Ad. capite, dorso uropygioque cum pectore superiore coccineis, plumis ad basin nigris; macula anteoculari, alis caudaque nigris, his nitore nonnullo metallico; corpore subtus fuliginoso-nigro; remigum margine interna albida; rostro pedibusque nigris. Long. al. 2.9, caud. 2.1, rostr. .7, tars. .75 (poll. Angl.).

Jr. Myz. nigriventris similis, sed supra magis brunnea, et subtus dilutior; dorso uropygioque castaneo-brunneis, nec rubris.

Hab. in Novis Hebridibus.

This Honey-eater, one of the few of this genus known to the older authors, is very nearly allied to *M. nigriventris* of the Samoan group, which it replaces in the New Hebrides.

The adult bird (I agree with Messrs. Hartlaub and Finsch in considering that in this section of the group the sexes are nearly similar) is distinguished from *M. nigriventris* by the scarlet of the upper parts and chest being duller, and extending not quite so far down on the chest. The black of the lower parts is less intense, being tinged with brownish; the white margin to the remiges internally is more distinct; and the bill is stouter. It is also a slightly larger bird.

The young bird is paler and browner above (not so much dark brown as greyish brown), and paler and yellower below; the rump and back are washed with chestnut-brown. Judging from the series of specimens I have seen, the red colour in this species seems to appear first on the head, and not on the back as in *M. nigriventris*. The remiges, as usual in the young of this genus, are externally lined with olive-yellow. From *M. lifuensis* this species may be distinguished by its larger size and by the red extending on to the breast. Latham's description and figure clearly apply to this bird, not to *M. lifuensis*.

The irides are marked "black" or "dark brown."

Latham describes this bird from the island of Tanna, where, he says, it is called "Kuyameta" and is common, sucking the juices of flowers; and I have seen specimens collected on that island by Mr. Layard. There are specimens in the British Museum from Erromango and Aneiteum (*Cuming*); and Canou Tristram has received it from the latter island, as well as from Tanna and Aniwa. It thus seems to be confined rather to the southern portion of the New-Hebridean archipelago, being replaced in the north by *M. caledonica*? and *M. chermesina*.

## 22. MYZOMELA LIFUENSIS.

*Myzomela lifuensis*, E. L. and L. C. Layard, Ibis, 1878, p. 258.

♂ capite, dorso uropygioque coccineis; alis, cauda et corpore subtus toto cum macula anteoculari fuliginoso-nigris; alis caudaque nitore nonnullo metallico; remigum margine interna albida; rostro nigro, pedibus nigro-corneis. Long. tota circa 4.2, al. 2.5, caud. 1.75, rostr. .55, tars. .63 (poll. Angl.).

Hab. in Lifu, ex insulis "Loyalty" dictis.

Canon Tristram having kindly submitted to me two skins (now in his collection, both marked "males" and adult) collected by the Messrs. Layard, who first indicated this species, I can give a more complete account of it, and say that it is certainly a very good species. It is nearly allied to *M. nigriventris* and *M. cardinalis* of the Samoas and New Hebrides respectively, more particularly to the last, but is at once distinguished from both by the red below not extending beyond the head, the breast being sooty-black like all the rest of the lower parts. It is also a considerably smaller bird; the bill is shorter and more slender; the tarsi are not so stout, and the claws smaller. From *Myzomela erythrocephala* it is easily distinguishable by the uniform black of the lower parts.

Mr. Layard notes the "beak black, legs very dark brown, iris dark brown," and food "insects." Both specimens were obtained at Hepenehe, the chief town in the island of Lifu, the largest of the Loyalty Islands.

Whether *M. erythrocephala* of Marie's list (Ibis, 1877, p. 362) is this bird, remains uncertain; as yet, *M. caledonica* is the only *Myzomela* certainly known to be found on New Caledonia itself.

## 23. MYZOMELA CHERMESINA. (Plate XXV. fig. 1.)

*Myzomela chermesina*, Gray & Mitch. G. B. i. pl. 38 (1840) (fig. mala); Gray, Cat. B. Trop. Isl. p. 11 (1859); Forbes, P. Z. S. 1878, p. 352.

♂ ad. fusco-nigricans, alis caudaque nitore nonnullo metallico; mento, gula, pectore lateribusque abdominis, cum dorso uropygioque nitide coccineis, plumis ad basin nigris; subalaribus nigris, remigum pogonio interno griseo; rostro nigro, pedibus brunneo-corneis. Long. tota circa 4½, al. 3, caud. 2, rostri ⅝, tarsi ⅝ (poll. Angl.).

Hab. in insulis Pacificis Rotumah et Mallikollo.

This species was first figured by Messrs. Gray and Mitchell in their 'Genera of Birds;' but no description was given, the species being only mentioned in the list of the species of *Myzomela*; nor was any habitat indicated. Bonaparte, and Gray later on, in his 'Hand-list' (vol. i. no. 1989), gave "New Guinea?" as the locality, without any apparent reason for so doing. The bird was never recognized again till last year, when Mr. Selater received two specimens, an adult male and a nearly adult female<sup>1</sup>, from the Rev. G. Brown, C.M.Z.S., of the Wesleyan Mission, together with some other birds, from the small

<sup>1</sup> These birds are now in the Paris Museum.

island of Rotumah, north of the Fijis. Fortunately Gray's type is still in existence in the gallery of the British Museum; and on comparing the birds from Rotumah with it, it was at once evident that they were of the same species, though Gray's figure represents a bird with a uniformly scarlet underside. About the same time Mr. Sharpe got a specimen (from which the figure is taken) of the same bird, apparently identical in every respect, from the island of *Mallikollo* (in my paper, *l. c.*, by a mistake I wrote *Erromango*) in the New Hebrides, where it was obtained by Mr. Wykeham Perry, H.M.S. 'Pearl.' The species thus has a wide range, though I believe the above-mentioned four specimens (which are all nearly or quite adult) are as yet the only ones of this bird ever brought to Europe. The female is similar to the male in colour, but a little duller (*conf. l. c.* p. 353).

#### 24. MYZOMELA ROSENBERGI.

*Myzomela rosenbergi*, Schleg. Ned. Tijd. Dierk. iv. p. 38 (1871); Rosenberg, Reist. Geelv. Baai, p. 138, t. xvi. fig. 2 (1875); Meyer, Sitzungs-ber. Wien. Akad. lxix. i. pp. 211, 212 (1874).

♂ ad. *niger nitore nonnullo metallico; collo, dorso, uropygioque, cum pectore splendide coccineis; rostro nigro, pedibus corneis. Long. al. 2.5, caud. 1.7, rostr. a culm. .65, tars. .55 (poll. Angl.).*

♀ *rufescenti-brunnea, plumis ad basin nigris, ad rhachin pallidioribus; fronte, pectore uropygioque coccineis, mento gulaque nigricantibus; alis caudaque fuscis, remigibus externe olivaceo-limbatis, tectricum alarum apicibus brunneis; pogoniis internis remigum albis.*

♂ jr. *femine similis, sed fronte, pectore, uropygio, mento gulaque corpore concoloribus.*

*Hab. in Novâ Guineâ.*

This beautiful and very distinct *Myzomela* was first described by Prof. Schlegel from two specimens, both males, collected by Von Rosenberg in the north-western peninsula of New Guinea. Dr. A. B. Meyer obtained five specimens from the Arfak Mountains near Hattam, at an elevation of about 3500 feet above the sea, during his expedition to New Guinea in 1873. Since then numerous specimens have been obtained by various travellers in the same district. That the species is not confined, however, to the Arfak Mountains is shown by the fact<sup>1</sup> that Signor D'Albertis obtained two skins of this same bird, identical with Arfak specimens, from the natives of the neighbourhood of Epa, near Hall Bay, S.E. New Guinea.

According to Dr. Meyer the adults of both sexes are similar, and the bird above described as the female (from two nearly identical specimens so sexed by Beccari) is really the young assuming adult plumage. Count Salvadori, however, writes me that he has about 40 specimens of this species, and maintains the view he has already expressed (*Ann. Mus. Civ. Gen. vii. p. 947, 1875*), that Meyer's "young" are in reality females. A very young bird (♂) in the

<sup>1</sup> *Cf. Ann. Mus. Civ. Genova, vii. p. 799 (1875).*

Genoa Museum, described above, has only a trace of red on the throat, and is probably a bird of the year. The varied colouring of each feather gives a somewhat flammulated appearance to the head, back, and chest of the young and females.

### 25. MYZOMELA NIGRA.

*Myzomela nigra*, Gould, B. A. iv. pl. 66; id. Handb. B. A. i. p. 558 [nec *Cissomela nigra*, Bon. C. R. xxxviii. p. 261 (1854)].

♂ *capite, dorso, uropygioque cum pectore superiore et linea media abdominali nigris; lateribus abdominis, ventre et subcaudalibus albis; alis, subalaribus caudaque brunneis; rostro pedibusque nigris. Long. alæ 2·7, caudæ 1·7, rostri ·65, tarsi ·5 (poll. Angl.).*

♀ *supra brunnea, subtus albida, mento, gula et pectore fusco variegatis; stria superciliari et remigum margine interna albidis.*

*Hab.* in Australiâ.

This species, which differs somewhat in coloration from the other members of the group, has a wide range over Australia. Gould found it on the plains of the Namoi; and Gilbert met with it in Western Australia on the Swan River. Mr. Ramsay, in addition, marks it in his list from the Port-Darwin district, from the interior, Victoria, and S. Australia.

### 26. MYZOMELA PECTORALIS.

*Myzomela pectoralis*, Gould, P. Z. S. 1840, p. 170; id. B. A. iv. pl. 65; id. Handb. B. A. i. p. 557.

*Cissomela nigra*, Bon. (nec Gould), C. R. xxxviii. p. 265 (1854).

♂ *ad. niger, uropygio, mento, gutture et corpore subtus albis, pectore fascia angusta nigra transversim notato; rostro pedibusque nigris.*

♀ (*aut jr.*) *dorso medio castaneo-brunneo diversa.*

*Long. tota 4·5, al. 2 $\frac{5}{8}$ , caud. 1 $\frac{3}{4}$ , rostr.  $\frac{5}{8}$ , tars.  $\frac{5}{8}$  (poll. Angl.).*

*Hab.* in Australiâ septentrionali.

This *Myzomela*, which in its black-and-white coloration departs considerably from the general coloration of the group, is confined to the more northern parts of Australia. Gould's original specimens were from the N.W. coast. Mr. Ramsay in his list records it from Ports Darwin and Essington, the Gulf of Carpentaria, Cape York, and Rockingham Bay.

It is not as yet ascertained with certainty whether the chestnut-backed birds are the adult females, or merely the young, of this species.

Besides the above 26 species, which are all founded on actual specimens, and which are here recognized as valid, there remains the following, based on a figure of one of the older authors, but never yet again met with, which may or may not be a real bird. This is

## MYZOMELA PUSILLA.

*Le Kuyameta*, Vieill. Ois. Dor. ii. p. 92, t. 58 (1802). (*Certhia cardinalis*, Gm. in text.)

*Myzomela pusilla*, G. R. Gray, B. Trop. Isl. p. 10 (1859).

*M. cardinalis*, pt., F. & H. Orn. Centralpolyn. p. 57 (nota).

This extremely doubtful species was founded by Gray on a drawing (from a bird once in the Leverian Museum) in Vieillot's "Oiseaux Dorés." This plate, as well as the description, indicates a black-and-red *Myzomela*, like *M. cardinalis* or *M. rubratra*, but smaller ( $3\frac{1}{2}$  inches in length), and with the abdomen, vent, &c. entirely red, only the wings, tail, and an anteocular spot being black. In the letterpress the bird is named *Certhia cardinalis* of Gmelin; and the habitat assigned is "New Holland and Isle of Tanna," evidently copied from Latham's account of the last-named species.

## GEOGRAPHICAL DISTRIBUTION.

The genus *Myzomela* has rather a wide range, from Celebes on the west, to the Fiji and Samoan Islands on the east, and from Guam, in the Marianne group (in  $13^{\circ}$  N.) to S. Australia and Victoria (in  $38^{\circ}$  S.), but is strictly confined to the Australian region, in three out of the 5 subregions of which it occurs, being absent in New Zealand and in the Sandwich Islands.

The Papuan subregion is, as might naturally be expected, the richest in species, having 16, of which no less than 14 are peculiar. Australia proper has 5 species, of which three are peculiar, two occurring also in the Papuan subregion. In the Pacific subregion 7 species occur, of which all are peculiar.

Celebes has one species peculiar to itself (*M. chloroptera*), as likewise have Banda and Timor (*M. boiei* and *M. vulnerata* respectively).

The Halmahera group (Gilolo, Batchian, Morty, Ternate, &c.) have one (*M. simplex*), which on Obi is replaced by *M. rubrotincta*. Curiously enough, the genus, as far as we yet know, is absent from the Sula Islands, from the Ceram group, and from the islands between Timor and the Arus, though represented in all the islands around this area, and even in the little island of Banda.

In the western half of New Guinea six species occur, of which *M. adolphine* is peculiar to the Arfak country. *M. rosenbergi* reoccurs in the mountains of southern New Guinea; and *M. cruentata* apparently extends to New Ireland. *M. nigrita* occurs on the mainland, as well as in Jobi and Miosnom (where it is the only species), and in the Aru Islands. Mysol, Waigiou, and Salwatti have only *M. eques*, which also occurs on the mainland both in the N.W. peninsula and on the south coast. *M. obscura* occurs both in S.W. and S.E. New Guinea, and also in N. Australia. Mysore is tenanted by a single peculiar species (*M. rubrobrunnea*); whilst the Aru Islands have two species, neither peculiar, one (*M. erythrocephala*) occurring in N. Australia and S. New Guinea, if specimens from all these three localities are really identical. New Guinea east of  $140^{\circ}$

has four species, none of which is peculiar, three occurring on the mainland of the west part, whilst two are Australian (*M. obscura* and *M. erythrocephala*). In the Admiralty Islands there is a single peculiar species, *M. pammelæna*, replacing *M. nigrita* of the further west. One species, also peculiar, is found in the Solomons (*M. lafargii*); but on which islands has yet to be ascertained. On New Ireland and in the Duke-of-York group only one species, which is probably *M. cruentata*, occurs; whilst *M. sclateri* alone represents the genus in New Britain, and is peculiar.

In N. Australia all five Australian species occur; and *M. pectoralis* is confined to that district. *M. obscura* and *M. erythrocephala* are confined to this region in Australia, but range into the Papuan Islands. *M. nigra* and *M. sanguinolenta* have a wider range over Australia; and the former is the only representative of the genus in W. Australia: both are peculiar. No species occurs in Tasmania.

Proceeding to the Polynesian subregion, we find the Fijis inhabited by a single peculiar species (*M. jugularis*); and the same is the case in the Samoas, where *M. nigriventris* occurs, a representative form of *M. cardinalis*. The New Hebrides have no less than three species, of which *M. cardinalis* is peculiar and found on the more southerly islands of the group (Erromango, Aneiteum, Tauna, &c.), where it is the sole species. Mallikollo is inhabited (if the localities given can be trusted) by two species—*M. caledonica*, which also occurs on Vaté and Api, and *M. chermesina*, which has managed to extend its range to the isolated islet of Rotumah. New Caledonia has but one species, *M. caledonica*; whilst on Lifu occurs *M. lifuensis*. The Pelews, Mariannes, and Carolines are all inhabited by one species peculiar to these groups, *M. rubratra*. It is rather remarkable that no species of the genus has yet been found on the Tonga Islands, although these are situated between the Fijis and Samoan Islands; but our present knowledge of the range of the Polynesian species is very imperfect.

Many other of these islands have no species of *Myzomela* recorded from them; but I have little doubt that several new species remain to be discovered both here and further west in the islands east of New Guinea, as well as on the mainland of that great island itself.

The appended Table will show the geographical distribution of the species in a concise form.

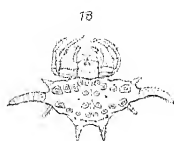
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	Celebes.	Timor.	Banda.	Halmahera group.	Obi.	Papuan Islands.	W. New Guinea.	Jobi and Miossom.	Mysore.	Aru Islands.	B. New Guinea.	Admiralty Islands.	New Britain.	Duke-of-York Islds.	New Ireland.	Solomon Islands.	N. Australia.	S.E. Australia.	W. Australia.	N. Hebrides.										Lifu.	New Caledonia.	Rotumah.	Fiji.	Samoa Islands.	Caroline Islands.	Marianne Islands.	Pelews.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
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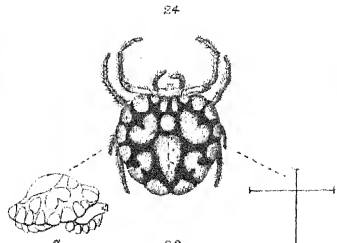
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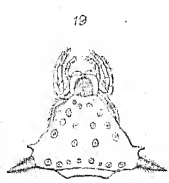
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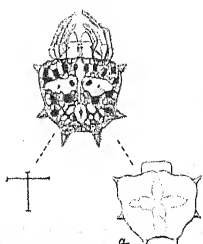
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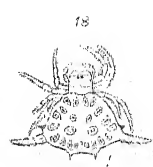
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C.P. Cambridge del.  
A.T. Hollick lith.

Wm. Newman & Co. lith.

Gasteracanthides.

P.S. Since the above has been in print, Mr. Selater has received a further consignment of birds from Mr. Brown. Amongst these are three specimens of *Myzomela*, namely:—a female of *M. selateri*; one of an entirely red species, probably = Ramsay's *M. coccinea* or *erythrina*, the receipt of which will enable the necessary comparisons of these species with *M. cruentata* to be made; and one of a species new to science.

5. On some new and little known Species of Araneidea, with Remarks on the Genus *Gasteracantha*. By the Rev. O. P. CAMBRIDGE, M.A., C.M.Z.S., &c.

[Received February 27, 1879.]

(Plates XXVI., XXVII.)

The Spiders described in the present paper are chiefly of the genus *Gasteracantha*, a genus well known and remarkable for the hard, horny epidermis of the abdomen, which is also armed with two, four, or six prominent spines, varying in length, strength, and direction, and issuing from different points of the margin. The abdomen is also marked on the upperside, and occasionally underneath, with numerous symmetrically disposed cicatricose spots, varying a little in number, size, form, and position. To these markings I have given, in the following descriptions, the name of *sigilla*, looking, as they do, very like *seals* impressed upon the abdominal surface. These *sigilla* probably indicate the points of attachment of muscular fibres, and are often useful in the determination of the species.

The number of Spiders of this genus, described by various authors, up to the present time, is about 170; many, however, are already ascertained, and many more will in time probably prove to be, synonymous with others. At first sight it would seem to be an easier matter to distinguish the species of *Gasteracantha* than those of many other genera. They are for the most part of good size; and the corneous, spiny abdomen, varying very much in its relative proportions and spines, furnishes characters so tangible that the species have for the most part been distinguished by these characters alone. No doubt these will always remain important characters, and in many instances decisive ones; but in some, at all events, the reception of a series of examples from the same locality leads me to suspect that there is a very great, and hitherto not sufficiently recognized, difference in the absolute as well as relative length, strength, and direction of the abdominal spines in different individuals of the same species. *Gasteracantha formosa*, Vins. (*infra*, p. 285, Pl. XXVI. fig. 11), is one instance of this; and *G. curvispina*, Guér., is probably another. Of this latter Spider (if I am right in my determination of the species) I have received a considerable series from the west coast of Africa; but no two individuals preserve exactly the same length, strength, or direction of the abdominal

spines. This will be found, I think, to be the case also with some other species when collectors will take the trouble to collect a series of examples, instead of being satisfied with a few or even single specimens of those forms which appear to differ most from each other. At present, therefore, it seems rather hazardous to describe, without reservation, as new species, Spiders of this genus differing only, or mainly, from others already described in the relative length, strength, or direction of some, or all, of these spines, especially if the spiders come from the same locality, and even though the difference in the spines may be considerable.

Another, often valuable, specific character, but almost unavailable in this group of Spiders, is the colour, and pattern formed by its distribution. The greater number of known species of *Gasteracantha* have been described from specimens dried and pinned like Coleoptera and other insects; and very frequently dried after having been for some time immersed in spirit of wine. The process of desiccation, under such circumstances, not only destroys the colouring, but very often itself alters the natural direction of the spines. We are probably therefore, in nine cases out of ten, totally ignorant of the true colours and markings of the *Gasteracanthides*. It is worth while noting, in proof of this, a description, from life, of a Spider included in the genus *Gasteracantha* by Mr. A. G. Butler (but probably belonging to a nearly allied one, *Peltosoma*, Sim.). The description referred to may be found in an account of the British Expedition against the Ashantees in 1874, 'Through Fanteeland to Coomassie,' by Frederick Boyle, p. 202, and is shortly as follows:—"The shell (of the abdomen) is about an inch across by half an inch in length, of the loveliest and most delicate yellow, scalloped at the edges, where occurs a dainty moulding of blue. Under the beautiful shell, protected by it on all sides, so that not even a claw projects beyond the cover, is the body and head, smooth and of a dark-red colour. Several were brought home. Captain Grant, 2nd W.I., has a handsome specimen." Thinking, from this account of its form and size, that this spider might possibly be identical with Mr. Butler's species (*Gasteracantha cambridgii*, Butl., Trans. Ent. Soc. Lond. 1873, p. 175, pl. iv. fig. 8), I sent a drawing of the latter to Captain Grant, who at once recognized it as the same species. Captain Grant's specimen was unfortunately lost on the way home; and I had therefore no opportunity of examining it; its identity, however, with the Spider above named may, I think, be taken as certain.

I have several dried examples of *Gasteracantha cambridgii* from the west coast of Africa, and have examined others in the Oxford University Museum, as well as in the British Museum. These are entirely of a uniform dull muddy-brown hue, and do not possess the slightest trace of the beauty described (and, I have no doubt, correctly described) by Mr. Boyle. It is very probable that preservation in spirit of wine might have retained something, if not all, of the original colours and markings of this Spider. I have in spirit numerous species of *Gasteracantha*; and many of them show great

vividness of colouring, as well as distinctness of markings. This is very seldom the case with dried specimens, of which I possess some similar in species to those preserved in spirit; but the former give no idea at all of the colours and pattern shown in the spirit-preserved examples.

Among the species of *Gasteracantha* described below is a very minute male adult (*G. rogersi*, sp. n., p. 292, pl. XXVII. fig. 23), from the river Coanza. This is as yet only the second male described in the genus. Few collections of Spiders come from exotic regions without containing (more or fewer) examples of the female sex; but, excepting in the two instances mentioned, the male sex appears to be nonexistent. This latter sex (as in those two cases) is probably always a pygmy compared with the female, and is very likely a good deal, if not altogether, different in respect of its abdominal armature. The females sit quite exposed in their orbicular snares, and so need a defensive armature, which the males do not require if they are, as I imagine, almost always, if not invariably, very minute, and live mostly in some kind of concealment or other—being also perhaps, compared with the female, very short lived. Two others of the Spiders here described are remarkable, and I believe quite novel, in their form—*Gasteracantha crepidophora*, sp. n. (p. 287, Pl. XXVII. fig. 14), from Dorey, New Guinea, and *G. acrosomoides*, sp. n. (p. 289, Pl. XXVII. fig. 19), from Madagascar. The two larger spines of the former very exactly resemble a pair of sharp-toed boots; and the latter is exceedingly like some spiders of the genus *Acrosoma*.

#### GASTERACANTHIDES.

##### Genus GASTERACANTHA.

GASTERACANTHA QUADRISPINOSA, sp. n. (Plate XXVI. fig. 1.)

Adult female: transverse diameter of abdomen, exclusive of the spines, 6 lines; longitudinal diameter  $2\frac{1}{2}$ .

Abdomen transverse-oblong; anterior margin curved, the convexity of the curve directed forwards; posterior margin curved to about the same degree, with the convexity of the curve directed backwards. Spines four, not very large, one at each of the four corners of the oblong, those of the anterior corners shortest and weakest, with a slight but distinctly forward direction; the posterior spines rather less in length than the width of that part of the abdomen, and projecting in a line parallel with its transverse axis. Colour yellow-brown, the spines and *sigilla* (which are of normal number, size, and position) rather darker. Legs short, femora yellowish, the rest dark blackish brown, and (as also are the spines) furnished with short hairs.

The cephalothorax projects but little beyond the fore margin of the abdomen, and is of a deep rich black-brown hue.

This Spider is allied to *Gasteracantha malayensis*, Sim., and *G. mengii*, Keys., two species very closely allied to each other, if

not identical; it is, however, much smaller, and differs both in the length, strength, and direction of the spines as well as in colour.

*Hab.* Australia.

*GASTERACANTHA CANESTRINII*, sp. n. (Plate XXVI. fig. 2.)

Female, immature?: longitudinal diameter, exclusive of spines, scarcely 2 lines, transverse diameter  $2\frac{1}{2}$ .

Spines four, one at each end of the abdomen, the fore and hind outlines of which they carry on to sharp points. These two lateral spines are larger, and very much stronger than the other two, which are at the posterior extremity of the abdomen, and their points a little divergent from each other.

The abdomen is of a dull blackish-brown hue; the sigilla normal in size, number, and position, and slightly tinged with reddish brown.

The cephalothorax is large, but of normal form; its colour, as well as that of the falces, legs, palpi, and abdominal spines, is a dull brownish yellow.

From its only known near allies (*G. quadridens*, C. L. Koch, and *G. pallida* ejusd.) it may be known at once by the much greater length and strength of the two lateral spines.

A single example (received through Frederick Bond, Esq.) from Antigua.

*GASTERACANTHA RIMATA*, sp. n. (Plate XXVI. fig. 3.)

Length of the transverse diameter of an immature female, exclusive of the spines,  $2\frac{1}{3}$  lines, that of the longitudinal diameter being  $1\frac{1}{3}$  line.

This Spider is allied to *Gasteracantha geminata*, C. L. Koch, but may be distinguished at once by the two lateral spines (on each side) being of different lengths, and diverging from each other; the posterior (or intermediate) spine is the longest and strongest.

In *G. geminata* the lateral spines adhere to each other for some distance, until the sharpening off of the points begins; they are also of equal size, and the anterior spine scarcely differs from the other in length. The posterior spines in the present Spider are also proportionally stronger.

Several examples, all immature, were received from Ceylon among numerous other Spiders kindly sent to me by Mr. G. H. K. Thwaites.

*GASTERACANTHA PAVESI*, n. sp. (Plate XXVI. fig. 4.)

Length of the transverse diameter of the adult female, exclusive of the spines, 7 lines; longitudinal diameter 4 lines.

There will be no difficulty in distinguishing this Spider from all others known to me; it forms, in fact, the type of quite a new group, whose characteristics are the wide separation between the anterior and intermediate spines, and the close proximity of the latter to the posterior ones, which last are also most abnormally separated. The anterior spines are small, directed straight forwards from the central portion of the very convex fore margin of the abdomen, the interval



separating these being about equal to the width of the cephalothorax. The intermediate spines are of moderate length, stout, but very slightly tapering, and directed a little backwards; not far behind each of these is one of the posterior spines, which are very small and of a sharp-pointed conical form, and directed more outwards than backwards.

The abdomen is of a dark yellowish brown hue, the sigilla and spines deep red-brown. The sigilla on the posterior margin are abnormal, being 10 in number instead of the usual number 9—three large on each side, with four small ones between: those on the anterior margin appeared to be normal in number (*i. e.* 10); but, owing to the injured state of that part of the abdomen, I cannot speak positively on the point. The cephalothorax is dull black, clothed with coarse, dull, greyish yellow pubescence; and the legs dark reddish brown, clothed with hairs of a dull greyish yellow hue.

*Hab.* Laos.

GASTERACANTHA FRONTATA. (Plate XXVI. fig. 5.)

*Gasteracantha frontata*, Blackw. Ann. & Mag. N. H. ser. 3, vol. xiv. p. 40.

Length of the transverse diameter of the adult female, exclusive of the spines,  $5\frac{2}{3}$  lines; longitudinal diameter nearly  $2\frac{1}{2}$  lines.

This Spider is another species of the "*fornicata*" group, but may be distinguished at once by the shortness and stoutness of the intermediate spines, which are very slightly directed backwards. The colour of the cephalothorax and legs is deep brown, the abdomen yellow, with, in some examples, a narrow, transverse, blackish bar connecting the anterior and two of the central sigilla; the part of the abdomen from which the posterior spines spring is dark yellow-brown, with a roundish yellow central blotch; the underside is deep brown, spotted with good-sized and distinct yellow spots; the spines and sigilla are reddish brown.

The figure is drawn from the type specimen described by Mr. Blackwall (*l. c.*).

*Hab.* East Indies.

GASTERACANTHA PECCANS, sp. n. (Plate XXVI. fig. 6.)

Adult female: length of the transverse diameter, exclusive of the spines,  $4\frac{1}{2}$  lines; longitudinal diameter rather over  $2\frac{1}{2}$  lines.

In the general form of the abdomen this Spider is much like *G. madagascariensis*, Vins.; but it differs totally in colours and markings; and the intermediate spines are shorter, much stronger, and straight; they taper also to a sharp point, not by a straight but by a curvilinear convex outline; the posterior spines also are shorter, and those of the anterior pair are almost rudimentary; the intermediate spines are directed a little backwards. The upperside of the abdomen is yellow tinged with brown, the two exterior sigilla at each end of the posterior row of 8 are surrounded with a blackish patch touching the abdominal margin; the two hinder sigilla also of the central four are each similarly encircled. The underside of the abdomen is black-

brown, marked and spotted with yellow. The sigilla are all red-brown, very small, especially the anterior ones, which are 10 in number. The cephalothorax is black, and the legs are black-brown.

*Hab.* Mauritius. (Received from R. H. Meade, Esq., of Bradford.) Possibly this is *Gasteracantha* (*Plectana*) *mauricia*, Walch.

*GASTERACANTHA CALLIDA*, sp. n. (Plate XXVI. fig. 7.)

Length of the transverse diameter of the adult female, exclusive of the spines,  $5\frac{2}{3}$  lines; length of the longitudinal diameter 3 lines.

This is another species of the "*fornicata*" group: the anterior margin of the abdomen between the two foremost spines forms a nearly even curve; the foremost spines are short and very slightly (in one example not at all) directed forwards. The intermediate spines are stout, scarcely curved, double the length of the anteriors, rapidly tapering from base to point, and but slightly directed backwards. The posterior spines are as long, but not so strong, as the intermediate ones; in one example, however, the posterior spines were shorter.

The cephalothorax is black, the legs black-brown, and the abdomen yellow-brown, the spines reddish brown, and the sigilla small and like the spines in colour. The different form of the fore margin of the abdomen and the stouter intermediate spines will at once distinguish this Spider from the next species, *G. flebilis*.

*Hab.* Trinidad.

*GASTERACANTHA FLEBILIS*, sp. n. (Plate XXVI. fig. 8.)

Length of the transverse diameter of the female (adult?), exclusive of the spines, 4 lines; longitudinal diameter slightly over 2 lines.

This spider is allied to *G. fornicata*, C. L. Koch; it is, however, much smaller; and though it may possibly be an immature example of that species, I am inclined to think it is distinct. Owing to the specimen being pinned and dry, I am unable to say positively whether it is adult or not; but I think it is. The anterior spines are short and directed a little forwards; the intermediate ones stout, not very tapering, double the length of the anterior, and with a distinctly backward direction. The cephalothorax, falcis, and legs are deep brown-black; the abdomen dull brown, with two transverse black bands, of which the anterior is the broadest: the posterior band appeared to be interrupted in the middle; but as the pin had passed through that point, this is not certain; the spines are red-brown.

*Hab.* Sarawak.

*GASTERACANTHA HARPAX*, sp. n. (Plate XXVI. fig. 9.)

Length of the transverse diameter of the adult female, exclusive of the spines, rather over  $5\frac{1}{2}$  lines; length of longitudinal diameter rather more than 3 lines.

This Spider is also of the "*fornicata*" group. It may be easily known by the weakness of the intermediate spines, which are scarcely double the length of the anteriors, and no stronger, if, indeed, quite so strong, and project at right angles to the longitudinal axis of the

abdomen. The anterior spines are directed slightly forwards; and the posterior are a little longer and stronger.

The cephalothorax is of a deep brownish black colour; that of the legs dark brown, and the abdomen dull yellowish brown; the spines and sigilla (which are of normal number and form) red-brown.

*Hab.* Sarawak.

*GASTERACANTHA MADAGASCARIENSIS.* (Plate XXVI. fig. 10.)

*Gasteracantha madagascariensis*, Vins. Aran. des Iles de la Réunion, Maurice et Madagascar, p. 242, pl. ix. fig. 6.)

From a careful examination of a series of examples received from Madagascar, I can detect no difference in the form of the abdomen, nor in the relative length, strength, or direction of the intermediate spines. It is a much smaller Spider than *G. formosa*, Vins., and quite distinct in its colours and markings. The figure (10, Plate XXVI.) is from one of the examples mentioned above. There appears to be considerable variety in the extent and continuity of the black markings on the abdomen.

*GASTERACANTHA FORMOSA.* (Plate XXVI. fig. 11.)

*Gasteracantha formosa*, Vins. Aranéid. des Iles de la Réunion, Maurice et Madagascar, p. 244, pl. ix. fig. 7.

*G. petersii*, Karsch, Monatsb. k. Akad. Wiss. Berlin, 1878, p. 322, pl. 1. fig. 6: Mozambique.

*G. milvoides*, Butler, Trans. Ent. Soc. Lond. May 1873, p. 159, pl. iv. fig. 2: South Africa.

*G. transversa*?, C. L. Koch, Die Arachn. iv. p. 14, pl. cxiii. fig. 259; hab. ?

*G. varians*, Cambr. MS. 1876: Madagascar.

*G. frontata*, Bl. Ann. & Mag. N. H. Dec. 1866, p. 463: S.E. Africa. Non *G. frontata* supra.

I feel but little doubt that all the Spiders included under the above synonyms are identical—although the difference in the relative length, strength, and direction of the large lateral (or intermediate) spines is not inconsiderable, and the proportional length and breadth of the abdomen (exclusive of the spines) also differ.

Out of eight examples (included under *G. varians*, Cambr.) received from the same locality in Madagascar, no two are exactly alike in the points above mentioned, though all are undoubtedly of the same species; the variations of the different examples run into each other, so as to defy any attempt to characterize them as distinctive of species. The typical form of *G. formosa*, Vins., is present among these eight examples, of which I have figured three of the varieties most widely separated from the typical form. In fig. 11 the large lateral spines are not only stronger than those of the typical *G. formosa*, but their curve and direction are exactly opposite. In fig. 11 a the spines are straight, and project at right angles to the longitudinal axis of the abdomen, one of them being much stronger and of a different form from the other; in fig. 11 b we have a nearer approach to the typical *formosa*.

Fig. 11 c is almost exactly identical with the type; it is from one of the examples included by Mr. Blackwall, *l. c.*, in his list of S.E. African Spiders as *G. frontata*, Bl., from which it is clearly distinct (vide *G. frontata*, Bl., *antea*, p. 283). An example from E. Africa (in my collection) is intermediate between the last-mentioned one and the figure given (*l. c.*) by Karsch of *G. petersii*, in which the only difference is the (apparently) stouter and more curved intermediate spines, and the less narrow abdomen. My example differs from my fig. 11 in being less narrow, but still not quite so broad, proportionally, from back to front as represented in Karsch's figure. I have also another example, from the Zambesi river, in which the abdomen is narrowest of all, and the length of the intermediate spines exceeds that of all the other examples and figures I have yet seen, their strength and direction being those of the typical *G. formosa*. This example comes perhaps the nearest to *G. milvoides*, Butl.

The locality of *G. transversa*, C. L. Koch, is not given by that author; but I should strongly suspect it to be African, especially as it is figured with transverse pale bands across the abdomen, which, in well-preserved examples of *G. formosa*, Vins., are well marked and characteristic.

It is possible that *G. fornicata*, C. L. Koch, may be of this same species; but as it comes from a widely distant locality (Java), it is safer at present to conclude it to be distinct. At any rate, never having seen an example from Java, I am unable myself to give any opinion upon it.

I have hesitated to include *G. nana*, Butl., among the synonyms of *G. formosa*, Vins., though it would not surprise me if it should some day be found to be identical.

*GASTERACANTHA IMPORTUNA*, sp. n. ? (Plate XXVII. fig. 12.)

Length of the transverse diameter of an adult female, exclusive of the spines, 6 lines; length of the longitudinal diameter 3 lines.

In this Spider the large lateral spines are not quite so long as in the last; but they are stronger, straighter, and have a more backward direction. The colours are like those of that species; but the example described is in a similarly bad state of preservation so far as colours are concerned. The extremities of the large spines have a strong steel-blue metallic hue.

It is only with great hesitation that I have described this Spider as distinct from *G. molesta*. I should not be at all surprised at a series of examples from the same locality some day proving it to be identical with that Spider, and possibly also with *G. formosa*, Vins.

*Hab.* West coast of Africa.

*GASTERACANTHA MOLESTA*, sp. n. (Plate XXVII. fig. 13.)

Length of the transverse diameter of an adult female, exclusive of the spines,  $7\frac{1}{2}$  lines; length of the longitudinal diameter a little over 3 lines.

This Spider is evidently allied closely to *G. formosa*, Vins.; but the large lateral spines are much less tapering than in any of the

varieties I have seen of that species ; and as it comes from the opposite side of Africa, I am induced to describe it as a distinct species.

The sigilla are rather large and of a deep reddish brown hue, as are also the spines, the cephalothorax, and legs, the falces being darker. The colouring of the abdomen generally has entirely disappeared, from the bad state of preservation of the only example in my possession.

*Hab.* West coast of Africa.

*GASTERACANTHA CREPIDOPHORA*, sp. n. (Plate XXVII. fig. 14.)

Length of the transverse diameter of the adult female, inclusive of the spines,  $7\frac{1}{2}$  lines ; longitudinal diameter, exclusive of spines, 3 lines.

The remarkable form of the intermediate spines, that of a boot with a sharp toe, will serve to distinguish this curious Spider from all others of the genus known to me.

The anterior spines are well removed from the intermediate ones, rather small, and not very strong, being similar in length but not quite so strong as the posterior ones. The intermediate spines are very strong, rather long, bent ; and near the extremity the curved point goes off nearly at right angles, forming a large roundish heel ; the point forms the foot ; and the whole bears a very exact resemblance to a boot.

The cephalothorax is black-brown ; the legs are dull brown, the femora being the lightest-coloured. The abdomen is of a somewhat subpentagonal form, and of a slightly brownish yellow colour, with a broad marginal black band on each side in front, including the anterior spines and four of the front sigilla ; the intermediate spines are orange-coloured on their basal half, the rest being black with a slight reflection of steel-blue ; the posterior spines are black. The anterior sigilla are normal in number, 10 ; the posterior ones only 8—two larger ones on each side, with four minute ones between them. All are rather small, and of a black colour.

This Spider appears to form the type of a very distinct group of the genus.

*Hab.* Dorey, New Guinea.

*GASTERACANTHA HELVA*. (Plate XXVII. fig. 15.)

*Gasteracantha helva*, Bl. Ann. & Mag. N. H. ser. 3, vol. xiv. p. 42.

Adult female : length of the transverse diameter at the widest point, exclusive of the spines, rather over 3 lines ; longitudinal diameter rather more than  $2\frac{1}{2}$  lines.

The abdomen is of a subpentagonal form ; the intermediate (or longest) spines are placed at the exterior angles of the hinder part of the abdomen ; they are moderately long, strong, rapidly tapering to a sharp point beginning a little way from their extremity and directed strongly outwards and a little backwards ; these spines are of a deep, rich, shining steel-blue colour. The posterior ones are shorter and much less strong, rather nearer to each other than each is to the

intermediate spine on its side, and a little divergent from each other. The anterior spines are the shortest and weakest; and each divides the outer side of the abdomen pretty exactly. The anterior and posterior spines have a browner hue than the other two; and all have a longitudinal yellow stripe underneath.

The abdomen is of a yellow, or yellow-brownish, colour on the upperside. The sigillæ are small; those on the anterior margin are normal in number, 10, but those on the hinder part are 8 only. The underside is black, spotted and reticulated with yellow.

The cephalothorax is dark brown, thinly clothed with fine hoary hairs. The legs are dull yellowish brown, obscurely marked and annulated with a deeper hue.

This Spider is not, I think, identical either with *G. lepelletieri*, Guérin & Walck., or with *Plectana prætextata*, Dol., as surmised by Mr. Butler, Trans. Ent. Soc. Lond. May 1873, pp. 155 & 172. The proportions of the length and breadth of the abdomen of the former are quite different; and, judging from examples in my possession of the latter (from Amboina and Sumatra), the form of the intermediate spines is distinct.

*Gasteracantha helva*, Bl., has never before been figured; so that the figure given here, from Mr. Blackwall's type specimens in my possession, will perhaps be of assistance to arachnologists in the determination of the species.

*Hab.* East Indies.

#### GASTERACANTHA PROPINQUA, sp. n. (Plate XXVII. fig. 16.)

Adult female: length of the widest transverse diameter, exclusive of the spines, nearly 4 lines; longitudinal diameter  $2\frac{3}{4}$  lines.

This species is nearly allied both to *Gasteracantha blackvalli*, Keys. (Madagascar), and *G. sororna*, Butl. (Madras), but differs in several material respects from both. Among other differences, the anterior spines in the former are placed further forwards, and the posterior spines in the latter are considerably shorter.

The cephalothorax is brown-black, with a yellow-brown patch on each side of the four central eyes; and is clothed sparingly with coarse hoary hairs. The legs are brownish yellow; the tibiæ, tarsi, and metatarsi darkest, and (apparently) with still darker markings. The abdomen is subtriangular, hollow-truncate in front; it is of a clear yellow-brown hue, the spines deep black-brown with steel-blue (but not very strong) metallic reflections. The sigilla are small, 10 on the fore margin, and 8 on the hinder margin; the two central ones of these last are very minute and close together. The anterior spines are the shortest and weakest, and each, as nearly as possible, equally divides the side on which it is placed; the intermediate ones are long, strong, equal to the side of the abdomen in length, almost equally tapering throughout, and project outwards and a little backwards; the posterior spines are long, but not so long as the intermediate ones, and very much less strong, but much longer and stronger than the anteriors, and divergent. The underside of

the abdomen is deep blackish brown, marked and spotted with yellow.

*Hab.* Cambodia.

*GASTERACANTHA CLAVEATA*, sp. n. (Plate XXVII. fig. 17.)

This Spider is closely allied to *Gasteracantha* (*Plectana*) *clavatrix*, Walck., resembling it nearly in size and in the curious enlargement at the extremities of the intermediate spines; but the greater length and rather more slender shaft, and the still more club-like form of the bulbous termination of these spines in the present Spider, lead me to believe it to be of a distinct species.

In four examples before me of *G. clavatrix*, the upperside of the abdomen has a distinct, but irregular, narrow, submarginal, black band or stripe from the intermediate spines to the fore extremity, including the sigilla; I can detect no trace of this band in the present Spider. The sigilla are small, 10 in front and 8 behind, and of a red-brown hue, both the upper and under surface of the abdomen being of a uniform brownish clay-colour (though no doubt much faded by the drying of the specimen).

*Hab.* Celebes.

*GASTERACANTHA SIMONI*, sp. n. (Plate XXVII. fig. 18.)

Length of the transverse diameter of the adult female, exclusive of the spines, 4 lines; longitudinal diameter  $2\frac{2}{3}$  lines.

This Spider is nearly allied to *Gasteracantha crucigera*, Bradley, but differs in its markings as well as in the length and strength of its spines.

The abdomen is of a subpentagonal form, almost subtriangular, truncated at the apex. The intermediate spines are moderately long, strong, very slightly curved and a very little directed backwards, and placed at each corner of the hinder part of the abdomen; close in front of each is one of the anterior spines; these are very minute, but about the same size as the posterior ones. The colour of the abdomen is yellow; the sigilla are normal in number, of a deep red-brown colour, and the posterior pair of the four central ones are the largest; this is quite abnormal so far as I am aware. The spines are rich deep red-brown. The underside of the abdomen is yellowish, rugulose, thickly studded with very small reddish-brown circular tubercles, and also somewhat clouded with brown.

The cephalothorax is dark reddish brown, clothed with short, grey, adpressed hairs.

The legs are yellow-brown, lightest on the undersides of the femora; the tibiæ and metatarsi are darkest, a small part of the basal portion of the metatarsi and tarsi being yellow, giving a somewhat annulated appearance to those joints.

*Hab.* Cape York.

*GASTERACANTHA ACROSOMOIDES*, sp. n. (Plate XXVII. fig. 19.)

Length of the greatest transverse diameter of the adult female,

exclusive of the spines, rather over  $4\frac{1}{2}$  lines; longitudinal diameter  $2\frac{2}{3}$  lines.

This Spider is of a more decidedly subtriangular form than *G. simoni*—the anterior side, where the apex of the triangle is truncated, being of the same width only as the cephalothorax. The intermediate spines issue from the corners of the hinder part of the abdomen, at each posterior angle of the triangle; they are strong, but not very long, and are very slightly directed backwards; the anterior spines are very small, close in front of the intermediate ones, but not contiguous, and have very nearly the same direction. The posterior spines are quite rudimentary, being represented by two minute, but quite distinct, conical tubercles. The abdomen is yellow, with some dusky blackish patches along the outer margins, in front of, and including the anterior spines, as well as the sigilla on those parts. The sigilla are of a deep red-brown colour; the anterior ones are normal in number, 10; the posterior ones 8 only. The underside is dusky blackish, studded with very minute red-brown tubercles, and marked with a few yellow blotches.

The sternum is orange-yellow, bordered with red-brown.

The cephalothorax is pale reddish yellow-brown, the upper part of the caput being deep red-brown, the whole clothed with fine grey adpressed hairs. The legs are dark brown.

The similarity between the form of this Spider and that of some species of the genus *Acrosoma* is remarkably close; but the form of the cephalothorax, as well as the number and position of the spines on the abdomen, shows its true generic affinity.

Nine examples were received, some time ago, through Mr. W. Cutter, from Madagascar.

*GASTERACANTHA WEALII*, sp. n. (Plate XXVII. fig. 20.)

Length of the transverse diameter of an immature female (including the spines) 2 lines; longitudinal diameter (exclusive of spines)  $1\frac{1}{4}$  line.

The whole of this Spider is of a dull greenish olive yellow-brown hue, with a small yellowish spot on the middle of the fore margin of the abdomen; the cephalothorax and legs are paler than the abdomen, the legs showing faint traces of darker annulations. The caput is not elevated into a distinct conical prominence on the upper-side, though there is a tolerably well-marked longitudinal cleft or furrow along its centre, leaving a slight eminence on either side of the central line. The spines are short, scarcely differing in length, and mammosc, *i. e.* are formed by a uniform and gradual enlargement of the abdomen at the points where they spring, ending in a sharp point, but are not of the distinctly inverted nail-form like those of a New-Ireland species (*G. pentagona*, L. Koch) and some others.

The sigilla are small, tinged with red-brown, but indistinct; they are 8 in front, 2 at each end, 7 behind, and 4 in the centre.

The only example I have seen was contained among some Spiders sent to me, from Caffraria, by Mr. J. Mansel Weale, and is apparently of a very distinct and undescribed species.



*GASTERACANTHA OBSERVATRIX*, sp. n. (Plate XXVII. fig. 21.)

Length of the transverse diameter of an adult female, exclusive of the spines,  $4\frac{1}{4}$  lines; length of longitudinal diameter rather more than  $2\frac{1}{2}$  lines.

This Spider belongs to the *G. mammosa*, C. L. Koch, group; the spines are small, the intermediate and posterior ones being of the same length, and issuing from large circular prominences of the abdomen, which may, however, be really taken to form part of the spine itself.

The cephalothorax rises to a single undivided, blunt, conical eminence on the middle of the caput; its colour is reddish yellow-brown, darkest on the sides and thorax, and clothed thinly with grey hairs, of which some form a marginal band.

The legs are dull yellow, marked and irregularly annulated with reddish brown.

The abdomen is yellow-brown, clothed with grey hairs, and marked and marbled on the upperside with clearer yellow patches of different sizes, forming roughly an anterior curved band and a central large cruciform marking. The sigilla are normal in number (10 in front and 9 behind); but the four centrals of the front row are as large, or nearly so, as any of the rest; in fact the two fore centrals are the largest of all. Along the central longitudinal line are some small supernumerary sigilla.

Examples of this Spider, which is allied to *G. roseolimbata*, Dol., and *G. canningensis*, Stol, were received from the Pratos Reef in the China seas, where they were taken by Dr. C. Collingwood, M.D., and kindly sent to me, some years ago.

*GASTERACANTHA PROBA*, sp. n. (Plate XXVII. fig. 22.)

This Spider is of a quadrate form, a little narrower behind, and with the posterior outline somewhat curved, and is allied to, but, I think, distinct from, *G. cicatricosa*, C. L. Koch. In the adult female the length of the longest transverse diameter (which is at the fore margin) is  $3\frac{1}{2}$  to 4 lines; longitudinal diameter  $2\frac{3}{4}$  to 3 lines. The abdominal eminences on which the spines are placed are small. The spines are very small, sharp-conical, and scarcely differ in size; the anterior ones are placed, one at each extremity of the fore margin (which is but very slightly curved); they are slightly the smallest, and are directed a little forwards; the intermediate spines are a little directed backwards, and about equally divide the space between the anterior and posterior ones; but as the hinder division of the abdomen, on which the latter are placed, is more liable to shrink in preservation than the rest, the interval between the intermediate and posterior spines is sometimes less than that between the former and the anterior ones.

The cephalothorax is less raised at the caput than in most other species of the genus; the caput also, instead of being elevated in the middle, has a longitudinal furrow along that part; its colour varies from brownish yellow to dark blackish brown; and it is clothed with short grey hairs.

The legs are very short, strong, and yellow, marked or roughly annulated with black-brown.

The abdomen is mottled and marbled above with black and pale yellowish; the sigilla form most of the dark portions; and the rest is intersected with black veiny lines and markings, leaving, however, in some examples a tolerably distinct, large, yellow, cruciform marking extending over the whole of the upperside. The figure is taken from one of the examples in which this was most distinctly marked; the underside is blackish, spotted thickly with yellow spots and markings.

*Hab.* Caffraria, where it was taken by Mr. J. Mansel Weale, who kindly sent it to me, with other Spiders.

*GASTERACANTHA ROGERSI*, sp. n. (Plate XXVII. fig. 23.)

Length of the transverse diameter of the adult male  $1\frac{1}{3}$  line; longitudinal diameter 1 line.

This is, to me, a most interesting Spider, being the only male I have ever seen in the now numerously represented genus *Gasteracantha*; it is also, I believe, the second ever yet described; and it bears out a remark I formerly made with respect to the probable size and look of the males of this group.

The abdomen of the present Spider is of a nearly square form, with the corners rounded off and the anterior margin somewhat hollowed; its colour is a deep blackish brown, deeply covered with very minute pock-marks or round punctures, and a few short, somewhat spine-like, coarse, grey hairs. The spines are four in number, rudimentary, though quite visible, no trace, however, being discernible of any corresponding to the usual intermediate ones; those present are, one at each of the rounded fore corners, and two behind in the ordinary position of the posterior ones. The sigilla are 24 in number, of tolerable size, though rather indistinct, being merely rather darker than the rest of the abdominal surface, the middle of which is somewhat more convex than the sides; 20 of the sigilla form a marginal line round the whole of the abdomen; the rest form a central quadrangular figure.

The cephalothorax is large; the caput is elevated in a generally convex form, with but the very slightest longitudinal central indentation; it is also very strongly constricted behind the eyes on each side; its colour is like that of the abdomen; and it is covered with short coarse grey hairs.

The legs are short, strong, tapering towards their extremities, of a deep brown colour, the posterior half of each of the tarsi and metatarsi being of a yellowish colour, the anterior portion yellow-brown. They are clothed with greyish hairs; and there are a few spines beneath the tibiae of the first and second pairs.

The palpi are short; the digital joint very large, of a somewhat oval form, and with the palpal organs (which are quite simple in structure, with a prominent process at their base on the outer side) form a very large club-like mass; the radial joint is very short, and prominent on the outer side; the cubital joint is also very short.

The example above described was contained in a small collection

of Spiders made for me on the river Coanza (W. Africa) several years ago by Mr. Henry Rogers, of Freshwater, Isle of Wight. I am not aware of any described female *Gasteracantha* of which it may possibly be the male. It is not unlikely that the female may have the usual six abdominal spines; and it probably belongs to the group *Isacantha*, Simon<sup>1</sup>.

### Genus PARAPLECTANA, Capello.

#### PARAPLECTANA THORNTONI. (Plate XXVII. fig. 24.)

*Eurysoma thorntoni*, Blackw. Ann. & Mag. N. H. Nov. 1865, p. 348.

No figure has ever yet been published of this large and beautiful Spider; I have therefore great pleasure in being now able to give one of it, taken from the type specimen from which Mr. Blackwall's description was made.

That description, in its exactness, leaves nothing to be desired; it need, therefore, only be added here, that the jet-black ground-colour of the abdomen, with its somewhat raised, large and conspicuous bright-yellow markings, and yellow cephalothorax, render it one of the most striking and handsome known Spiders of this family.

An immature example (also a female) was received from Mr. Mansel Weale among the other Spiders collected by him in Caffraria.

#### List of Spiders described above, with reference to pages, Plates, figures, and localities.

- Gasteracantha quadrispinosa*, sp. n., p. 281, Pl. XXVI. fig. 1. Australia.
- *canestrinii*, sp. n., p. 282, Pl. XXVI. fig. 2. Antigua.
- *rimata*, sp. n., p. 282, Pl. XXVI. fig. 3. Ceylon.
- *pavesi*, sp. n., p. 282, Pl. XXVI. fig. 4. Laos.
- *frontata*, Bl., p. 283, Pl. XXVI. fig. 5. East Indies.
- *peccans*, sp. n., p. 283, Pl. XXVI. fig. 6. Mauritius.
- *callida*, sp. n., p. 284, Pl. XXVI. fig. 7. Trinidad.
- *flexilis*, sp. n., p. 284, Pl. XXVI. fig. 8. Sarawak.
- *harpax*, sp. n., p. 284, Pl. XXVI. fig. 9. Sarawak.
- *madagascariensis*, Vins., p. 285, Pl. XXVI. fig. 10. Madagascar.
- *formosa*, Vins., p. 285, Pl. XXVI. fig. 11. Madagascar; S. & E. Africa.
- *importuna*, sp. n., p. 286, Pl. XXVII. fig. 12. W. coast of Africa.
- *molesta*, sp. n., p. 286, Pl. XXVII. fig. 13. W. coast of Africa.
- *crepidophora*, sp. n., p. 287, Pl. XXVII. fig. 14. Dorey, New Guinea.
- *helva*, Blackw., p. 287, Pl. XXVII. fig. 15. East Indies.
- *propinqua*, sp. n., p. 288, Pl. XXVII. fig. 16. Cambodia.
- *clavata*, sp. n., p. 289, Pl. XXVII. fig. 17. Celebes.
- *simoni*, sp. n., p. 289, Pl. XXVII. fig. 18. Cape York.
- *acrosomoides*, sp. n., p. 289, Pl. XXVII. fig. 19. Madagascar.
- *wealii*, sp. n., p. 290, Pl. XXVII. fig. 20. Caffraria.
- *observatrix*, sp. n., p. 291, Pl. XXVII. fig. 21. Pratos Reef, Chinese Sea.
- *proba*, sp. n., p. 291, Pl. XXVII. fig. 22. Caffraria.
- *rogersi*, sp. n., p. 292, Pl. XXVII. fig. 23. River Coanza.
- Paraplectana thorntoni*, Blackw., p. 293, Pl. XXVII. fig. 24. Zambesi River.

<sup>1</sup> Dr. Thorell writes to me, lately, that he has just received from New Guinea, or the neighbouring islands, the males, "true pygmies," of *Gasteracantha lepelletieri* and *G. crucigera*, Bradley, descriptions of which I hope we shall soon have from the pen of that able arachnologist. The only other known male of *Gasteracantha* is that of *G. parvula*, Thor., from Singapore.

March 18, 1879.

Prof. St. George Mivart, F.R.S., V.P., in the Chair.

The Secretary called attention to some Japanese Deer (*Cervus sika*) lately presented to the Society by Viscount Powerscourt.

These Deer were from the herd of Japanese Deer belonging to Lord Powerscourt, at Powerscourt, in Wicklow, Ireland, which had been originally commenced in 1859 with three hinds and a stag of *Cervus sika*, purchased of a London dealer. These animals had thriven well and multiplied exceedingly; and the herd now consisted of at least eighty individuals. Lord Powerscourt had at various times supplied stock from it to the following Deer-parks:—

1. That of Earl Annesley, Castle Wellan, co. Down.
2. That of Sir Victor Brooke, Colebrooke, Fermanagh.
3. That of Sir Croker Barrington, Bt., Glenstal, Limerick.
4. That of the Earl of Ilchester, Melbury, Dorset.
5. That of Lord William Osborne, Tally-allan, Scotland.

The following extracts from a letter recently addressed to the Secretary by Viscount Powerscourt on this subject were read:—

“There are certainly more than eighty Japanese Deer in the parks here now. It is very difficult to count them accurately, as there is so much wood; but I saw sixty-five in one lot together one day last autumn. I know that that was not the whole lot, because there were little lots scattered about besides. There are certainly eighty, if not more. Japanese Deer require no care of any kind; they are as hardy as Fallow or Red Deer; and the venison is as good: we had a haunch last year with more than two inches of fat on it. The haunches are small and of a handy size, about the size of mutton. Japanese Deer rut at the same time as the Fallow Deer. They are certainly not less hardy than Fallow Deer, I think more so. They have a very thick coat in winter; and I often see them up on the high ground when the Fallow Deer are in the shelter. The bucks are quite black in winter, and only show their spots very little; the old ones do not show them at all. Like all Deer, the young ones are spotted, and the spots get fainter as the animal gets older; the old does as well as the old bucks almost lose them; the old bucks lose them altogether. They make two noises when rutting—one a sort of scream, the other a prolonged whistle, just like a man calling another at a distance; till I knew what it was, I was several times almost sure it was some one looking for me when I was shooting in the park. Their beauty is unquestionable; and when they are startled, and spread out the white long hairs on their haunches like a target as they jump away, they are very graceful.”

The following papers were read:—

1. On a new Species of Barn-owl from the Island of Viti-Levu. By Dr. G. HARTLAUB, F.M.Z.S.

[Received March 3, 1879.]

Mr. S. Cæsar Godeffroy, of Hamburg, has received of late by means of one of his collectors, Mr. Kleinschmidt, a fine adult pair of a Barn-owl, which had been shot by a Mr. Storck on the banks of Wai-manu, a confluent of the Rewa river, in the island of Viti Levu. These birds having been confided to my examination by Mr. D. Schmeltz, the well-known Curator of the Museum Godeffroy, the first thing I did was to compare them most carefully with certain other Australian and Oceanic species, with which I thought they might possibly coincide, viz. a fine series of the Lulu Owl (*Strix delicatula*) from different localities (Continental Australia, Tonga, Viti, Samoa group, &c.), as also with examples of *Strix personata*, and *Strix castanops*.

But the new Owl has nothing whatever to do with any of these species. I am, on the contrary, fully convinced of its being undescribed; and I propose to name it after the able and zealous curator of the ornithological department of the Paris Museum.

STRIX OUSTALETI, n. sp.

Mas supra in fundo ochraceo-fulvo umbrino-fuscus, maculis minutis albidis, obscure circumdatis, irregulariter longitudinalibus rarius notatus; disco in fundo albido rufescente lavato, intense fusco-rufescente cincto, macula anteoculari fusco-nigricante; subtus læte ochraceo-fulvus, maculis rarioribus subrotundatis vel subtriangularibus nigricantibus; hypochondriorum maculis nullo modo diversis; abdomine imo, cruribus crissoque immaculatis albidis, subcaudalibus concoloribus, albido-fulvescentibus, apicem versus maculis nonnullis parum distinctis; tarsi dimidio superiore rarius plumoso, pallide rufescente, inferiore subnudo; tectricibus alarum minoribus interscapulio concoloribus; remigibus primariis, eorum tectricibus scapularibusque ex parte dilute rufescenti-fulvis, fasciis quatuor angustioribus apicibusque largius nigricanti-fuscis, pogonio externo prope marginem fusco vermiculato, interno marginem versus sensim albicante, fasciis incompletis; scapularibus dorso proximis ad apices late fuscis, viz. vermiculatis maculaque parva apicali alba; subalaribus albis, ex parte rufescentibus, maculis subrotundatis, nigro-fuscis; rectricibus dilute ochraceo-fulvis, fasciis 3-4 angustis nigricantibus; interstitiis sicut in remigibus non vermiculatis, apicibus albido fuscoque variis; rostro corneo-albido; pedibus pallidis, unguibus corneo-cærulescentibus.

Long. tot. circa 37 cent., al. 33 cent., caud. 13 cent., tars. 81 mill., culm. 38 mill., dig. med. (ung. excl.) 35 mill.

Fœm. minor, obsoletius tincta, pallidior; notæi maculis minoribus et minus distinctis, gastræi pro mole majoribus; subalaribus purius albis.

Long. tot. circa 35 cent., al. 31 cent., tarsi 29 mill.

The common Barn-owl of the Viti Islands is *Strix delicatula*, a species so *totally* different that it is unnecessary to enter more fully upon these differences. Suffice it to remark that the wings and the tarsi are *much* longer in our new species. This latter comes somewhat nearer to the light phase of *Strix novæ hollandiæ* (sive *personata*). But that is altogether a stouter bird, the feet and beak being much stronger than in *Strix oustaleti*, whereas the tarsi and the wings are proportionally longer in the new species. *Strix novæ hollandiæ* has the whole tarsi feathered with a thick white down; in *Strix oustaleti* the lower half of the tarsus is almost naked, and the upper very thinly feathered.

There are also many and very striking differences in the colours of the two birds. The minute whitish vermiculation on the upper parts of *Strix novæ hollandiæ* is entirely wanting in *Strix oustaleti*. The spots on the sides of the abdomen are more or less enlarged and bar-like in *Strix novæ hollandiæ*; they are of the same size and form as those on the breast and epigastrium in *Strix oustaleti*. The number of the dark bands in the primaries and the tail-feathers is six in *Strix novæ hollandiæ*, four in *Strix oustaleti*. The colours of the tail-feathers are very different in the two birds, the interstices being thickly mottled with brown and whitish in *Strix novæ hollandiæ*, fulvous and without any markings in *Strix oustaleti*. The apical part of the greater remiges is broadly mottled with whitish and brown in *Strix novæ hollandiæ*, whereas it is of a uniform dark blackish brown in *Strix oustaleti*.

The existence of *two species of Barn-owls* in so small an island as Viti-Levu is a curious fact.

The type specimens of this description are and will remain in the Museum Godeffroy at Hamburg.

## 2. On Female Deer with Antlers.

By EDWARD R. ALSTON, F.L.S., F.Z.S., &c.

[Received March 4, 1879.]

The occasional abnormal development of antlers in female Deer (outside the genus *Rangifer*) presents some points of interest, as bearing on the arrangement of the family *Cervidæ*, and on the probable evolutionary history of these weapons.

My attention has been lately turned to this subject by the record of such an instance in the Roedeer (*Capreolus caprea*, Gray<sup>1</sup>), in the 'Field' of the 18th January; and I am indebted to the courtesy of the gentleman who shot it, Mr. John B. Fergusson,

<sup>1</sup> I may here note that the name *europæus* has been supposed to have priority over Gray's specific title, being sometimes quoted as from J. Brookes's 'Catalogue' of his Anatomical and Zootomical Museum (1830), a reference which has even found its way into Engelmann's 'Bibliotheca.' A copy of this list is preserved in the library of the Royal Society; and it proves to be merely a sale-catalogue, with no claim whatever to be regarded as a scientific publication.

for further particulars, which add much to the interest of the case. The doe in question was killed on the estate of Sir James Fergusson, Bart., of Kilkerran, Ayrshire, on the 5th January, 1879. The antlers were "in the velvet," one being a simple curved snag about six inches in length, while the other was represented by a short stump. The animal was in good condition, and was *not* barren; for on the day she was shot she was accompanied by a last-year's fawn, and her nipples showed evident signs that she had recently been suckling. Most unfortunately the head was not preserved; but Professor Flower has kindly called my attention to the



Skull of female Roe-deer, with antlers.

skull of another fertile antlered doe Roedeer, which is now in the Museum of the Royal College of Surgeons. This example was shot by the Earl of Egremont near Petworth, Sussex, in 1810<sup>1</sup>, and presented by him to the Museum. The antlers, as shown in the drawing, have evidently been covered with the velvet. The right is a simple curved snag about three inches in length, with a well developed burr; the other is represented by a small mushroom-shaped burr without any beam. Lord Egremont in his letter expressly states that the Deer was "a very old and uncommonly large female, with two young ones in her."

<sup>1</sup> Cat. Coll. R. Coll. Surg. part v. 1831, p. 17. The exact date given in Lord Egremont's letter is "2nd August, 1810;" but from the context it is evident that this is a misprint for April.

In Germany, where the Roedeer is more plentiful than in this country, many does with antlers have been recorded, no fewer than *forty* instances being known to Dr. Altum<sup>1</sup>. Most of these were barren animals, and the antlers were always of a more or less abortive character, except in one case, in which the normal male form was well reproduced; but several were fertile, and were either with young when they were killed, or had recently given birth to fawns. The abnormal antlers appear to be always persistent, and to be permanently covered with the velvet.

In America the same abnormality appears not to be very uncommon in the Virginian Deer (*Cariacus virginianus*, Bodd.). Judge Caton says that he has seen many accounts of does with small, simple, velvet-clad antlers, and describes such a head in the National Museum at Washington, in which the beams are about six inches long. He has heard of a similar case of a doe killed in California, probably *Cariacus columbianus* (Richardson)<sup>2</sup>; and Mr. Dresser informs me that in New Brunswick he once examined in the flesh a female Moose (*Alces machlis*) with well-developed bifurcated antlers.

In the Deer of the restricted genus *Cervus*, on the other hand, the occurrence of antlered females seems to be extremely rare. In all the voluminous literature of German woodcraft Dr. Altum has only been able to find records of *five* cases of the abnormality in the Red Deer (*Cervus elaphus*, Linn.), of which the latest dates from early in the last century<sup>3</sup>. I have not been able to find any record of its occurrence in the Fallow Deer, nor, in fact, in any other species of *Cervus*, except the Sambar, *C. aristotelis*, Cuv., of which Mr. Vincent Ball informs me that there is a hind with a single antler now living in the Zoological Gardens at Calcutta.

We thus find, scanty as is the hitherto recorded evidence, that the development of antlers in the female is a not very uncommon abnormality in the two best-known genera of Sir Victor Brooke's section of *Telemetacarpæ* (*Capreolus* and *Cariacus*), occurs in a third (*Alces*), and is normal in a fourth (*Rangifer*), while, as far as we know, it is extremely rare in the *Plesiometacarpæ*. As the former division is the least specialized, these facts seem to me to indicate that the abnormalities are instances of atavism, and that the primeval Deer probably possessed antlers in both sexes. I make this suggestion, however, with all deference; for the contrary view has been adopted by Mr. Darwin, who holds that both the antlers of the *Cervidæ* and the horns of the *Bovidæ* were primarily and essentially sexual weapons, first developed in the males only. "When the males are provided with weapons which in the female are absent, there can hardly be a doubt that these serve for fighting with other males, and that they are acquired through sexual selection, and were transmitted to the male sex only"<sup>4</sup>. Of the Reindeer he says:—"We may conclude that the possession of fairly well-developed horns by the female Reindeer is due to the males having at first acquired them as weapons for fighting with other males, and, secondarily, to their development from some

<sup>1</sup> Forstzoologie, i. p. 230.

<sup>2</sup> Antelope and Deer of America, pp. 232, 233.

Forstzoologie, i. p. 211.

<sup>4</sup> Descent of Man (2nd ed.), p. 502.



unknown cause at an unusually early age in the males, and their consequent transference to both sexes."<sup>1</sup>

That sexual selection has played a very important part in the subsequent development of the horns and antlers of the Pecora there can be no reasonable doubt; but the known facts appear to me to indicate that they were probably *first* developed in both sexes as organs of defence against common enemies. They are present in the females of the *Camelopardalidæ*, in those of all the *Bovidæ* except twelve genera of *Antilopinæ*<sup>2</sup>, and in those of one genus of the least-specialized section of the *Cervidæ*, while we have seen that they are not unfrequently abnormally developed in the two other genera of the same section with which we are best acquainted. The same abnormality, it may be added, occurs in at least one of the genera of Antelopes, in which the females are usually hornless<sup>3</sup>.

On the assumption that the antlers and horns of the Pecora were first developed in the males only, their presence in the females of so many forms can only be explained by the hypothesis that "an unknown cause" has led to their transference from the other sex. On the other hand, if they were at first common to both male and female, the problem appears to me to be capable of a more satisfactory solution. In the males they would naturally be further developed by sexual selection, and in the females the strain on the constitution would tend to their reduction or even elimination—this strain, as Mr. Darwin himself has pointed out, being much the greatest in the *Cervidæ*, in which the weapons require to be renewed every year. That they should be retained (usually in reduced size) by the females of most of the forms with non-deciduous horns appears therefore to be natural; while their retention in the female of the Reindeer, and their occasional abnormal development in those of other little-specialized Deer, is no more than we should expect on the doctrine of heredity.

### 3. Remarks on some Parrots living in the Society's Gardens.

By P. L. SCLATER, M.A., Ph.D., F.R.S., Secretary to the Society.

[Received March 13, 1879.]

(Plate XXVIII.)

During the preparation of a new edition of the List of Vertebrates in the Society's Collection I have, as on former occasions of a like nature<sup>4</sup>, made several notes referring to special rarities and necessary changes in nomenclature of the Psittacidæ, which I beg leave to offer to the Society.

Our series of Psittacidæ at the present moment consists of about 170 individuals, belonging to 98 species, amongst which, besides those

<sup>1</sup> *Tom. cit.* p. 504.

<sup>2</sup> Sir V. Brooke, P. Z. S. 1878, p. 884.

<sup>3</sup> Blyth, as quoted by Mr. Darwin, 'Descent of Man,' p. 505.

<sup>4</sup> Cf. P. Z. S. 1867, p. 183, et 1871, p. 493.

specially mentioned below, are examples of *Licmetis gymnopsis*, *Ara spixi*<sup>1</sup>, *Coracopsis barklyi*, *Chrysotis guildingi*, *Chrysotis bouqueti*<sup>2</sup>, and *Nestor hypopolius*.

The species, however, to which I now wish to call special attention are the following;—

1. BROTOGERYS TUIPARA (Gm.), and

2. BROTOGERYS CHRYSOPTERA (Linn.).

Dr. Finsch has regarded the latter of these two birds as the young of the former, but, I believe, quite incorrectly, as will be apparent to those who examine our living specimens of these two species, of which I also exhibit skins from my collection. *B. chrysoptera* has a narrow frontal margin of dark brown, and a brownish throat, which never develops into the orange front and chin-spot of *B. tuipara*.

In my 'Catalogue of American Birds' (p. 347) I have called *B. tuipara* *B. notata*, being the bird figured in Pl. Enl. 77. fig. 2 (undè *Psitt. notatus*, Bodd.), and *B. chrysoptera* I have called *B. tuipara*.

Certain localities are, for *B. tuipara*, Barra do Rio Negro (*Wallace*), and for *B. chrysoptera*, Venezuela (*Mus. P. L. S. et S.-G.*); but both species seem to occur in Guiana.

3. PALEORNIS CYANOCEPHALUS (Linn.).

4. PALEORNIS ROSA (Bodd.).

We have now also adult examples of both these nearly allied species, which have likewise been united by Dr. Finsch, but are clearly distinguished by Mr. Hume (*Stray Feath.* ii. p. 15).

Mr. Gould has lately given excellent figures of both (*Birds of Asia*, pt. xxvi.), but has unfortunately reversed the names.

5. PALEORNIS FASCIATUS.

*Psittacus fasciatus*, P. L. S. Müller (ex Pl. Enl. 517).

*Palæornis fasciatus*, Hume, *Stray Feath.* vii. p. 164.

*Palæornis melanorhyncha*, *Scl. P. Z. S.* 1871, p. 771, et 1878, p. 999; Blyth, *Ibis*, 1873, p. 79.

*Palæornis schisticeps*, *Scl. P. Z. S.* 1876, p. 696.

I quite agree with Mr. Hume (*l. s. c.*) that the figure in the *Planches Enluminées* (517), attributed by Finsch to *P. javanicus*, is more probably intended for its Indian ally (*P. lathamii* et *P. melanorhynchus* of Finsch), and that the best plan is to call the latter *P. fasciatus*.

Of this species we have now three examples living in the collection, namely:—

a. A black-billed bird (and therefore, I presume, a female), presented by Mr. Edmund Warre, April 12, 1871, and stated to have been brought from Cashmere. This is the specimen alluded to by Blyth, *Ibis*, *l. s. c.*

<sup>1</sup> See *P. Z. S.* 1878, p. 976, pl. lxi.

<sup>2</sup> See *P. Z. S.* 1875, p. 61, pl. xi.

b. A second black-billed specimen, purchased Sept. 25, 1876. This bird, when in immature and dirty plumage, on its first arrival, was wrongly referred to *P. schisticeps*, of which species we have never received living specimens.

c. A bird with the upper mandible red, and therefore, I suppose, male, brought from Muttra, North-west Provinces, and presented Feb. 21, 1878, by Mrs. Barthorp.

Of the allied form of Java and Borneo (*P. javanicus*<sup>1</sup>) we have at present no specimens in the Collection.

#### 6. CAICA XANTHOMERA. (Plate XXVIII.)

*Caica xanthomeria*, Sclater, P. Z. S. 1857, p. 266.

*Psittacus xanthomerius*, Gray, List of Psitt. p. 73.

*Caica xanthomera*, Scl. P. Z. S. 1877, p. 419.

*Pionius xanthomerus*, Finsch, Papag. ii. p. 437.

Of this beautiful Parrot we received two living examples from Yquitos, on the Peruvian Amazons, in 1877, as already recorded. One of these is dead; but the other is now in fine plumage, as the accompanying sketch by Mr. Smit (Plate XXVIII.) will show.

Besides the type in the British Museum, from the Rio Javari (*Bates*), and a single example obtained alive by Natterer on the Madeira (Pelz. Orn. Bras. p. 264), our specimens are, I believe, the only ones known of this species.

#### 4. Notes on the Visceral Anatomy of the Tupaia of Burmah (*Tupaia belangeri*). By A. H. GARROD, M.A., F.R.S., Prosecutor to the Society.

[Received March 5, 1879.]

On February 8th, 1875, the Society received as a present from the Hon. Ashley Eden, C.S.I., a male Burmese specimen of *Tupaia belangeri*, which died, without any perceptible organic lesion, on December 18th, 1876.

Not much is known of the anatomy of the Tupaiidæ, the most important account of the viscera with which I am acquainted being that by Dr. Cantor on *Tupaia ferruginea*<sup>2</sup>.

Subjoined are the notes on the anatomy of the Society's specimen of *T. belangeri*.

The parotid and submaxillary glands are of about equal size, flattened and subcircular, a little less than half an inch in diameter, the duct of the former coursing superficially near the lower border of the powerful masseter muscle. The duct of the latter opens

<sup>1</sup> I cannot agree with Dr. Finsch's transfer of the name *alexandri* (Linn.) from the bird usually so called (i. e. *eupatrius*, Finsch) to the present species, for which the first name properly applicable seems to be *javanicus* of Osbeck, given in J. R. Forster's translation of Osbeck's Voyage to China, &c., vol. i. p. 156 (1781).

<sup>2</sup> Journ. Asiatic Soc. of Bengal vol. xv. 1846, p. 189.

by the side of its companion, at the tip of a small and slender pointed papilla situated just behind the symphysis of the lower jaw. The sublingual glands form a linear chain along the floor of the mouth.

The tongue, which is rounded at its tip, is 1·3 inch in length and ·35 inch broad, having its margins nearly parallel. Its upper surface is covered with filiform papillæ, among which are scattered papillæ fungiformes, very much in the same proportion as in the Ruminantia. There are three conspicuous circumvallate papillæ, arranged in the usual V-shaped manner.

A rudimentary unfringed sublingua exists, which is lanceolate in contour, just free at its margins, and with a strongly marked median raphé. It much resembles the same structure in *Cheiromys*<sup>1</sup>. Dr. Cantor says of the same organ in *Tupaia ferruginea*<sup>2</sup> that "on the lower surface of the tongue the frænum is continued to within a short distance of the apex, in a raised line, on either side of which the skin is thickened, fringed at the edges, and thus presenting a rudimentary sublingual appendage, somewhat similar to that observed in *Nycticebus tardigradus*, though in *Tupaia ferruginea* the fringes of the margin only are free, the rest being attached to the tongue, but easily detached by a knife."

The palate is transversely grooved, presenting upon its surface seven strong curved ridges, convex forward, and a small median incisor pad at its anterior end. The soft palate is smooth and lengthy, with no indication of the existence of a uvula.

The œsophagus has no free course in the abdominal cavity, being embraced by the diaphragm quite close to the cardiac orifice of the stomach.

The stomach is subglobose, with the cardiac and pyloric extremities approximate. When laid out flat its circumference is 6·2 inches, the interval between the axis of the œsophageal tube and that of the commencing duodenum being 0·9 inch. The squamous epithelium of the œsophagus does not enter the stomach, but ceases at its orifice, as in man. The gastric walls are simple, except that there are somewhat larger glands, in patches, on the anterior (ventral) surface.

The liver has no umbilical fissure, whilst both lateral fissures are strongly marked. There is a cystic fissure, at the bottom of which the fundus of the gall-bladder reaches the diaphragmatic surface of the organ. The *left lateral*, with its irregular inner margin, is the largest of the lobes; next comes the *right central*, on the visceral surface of which the imbedded gall-bladder lies diagonally. The *right lateral* lobe is slightly larger than the left central, and the caudate lobe but little smaller, whilst the Spigelian is a small sub-circular mass of hepatic tissue supported on a very slender stem. The bile and pancreatic ducts open together into the duodenum half an inch from the pylorus.

The walls of the intestines are thin. The small intestine is 29·25

<sup>1</sup> Owen, Trans. Zool. Soc. vol. v. pl. 24. figs. 8 & 9.

<sup>2</sup> Journ. Asiatic Soc. Bengal, 1846, p. 189, vol. xv.

inches in length, and 0·8 inch in circumference. The large intestine measures just over 3 inches, the conical and blunt-tipped cæcum not exceeding 0·7 inch in length. In Dr. Cantor's specimen of *Tupaia ferruginea* the small intestine is longer, reaching 40 inches. The mesenteric arteries form loops before they finally distribute.

The kidneys are smooth, with a single calyx. The testes appear large proportionately, the particularly big epididymis alone descending into the rudimentary scrotum. The prostate is bilobed, Cowper's glands being of fair size. The glans penis is elongately filiformly conical, and terminally a little blunted.

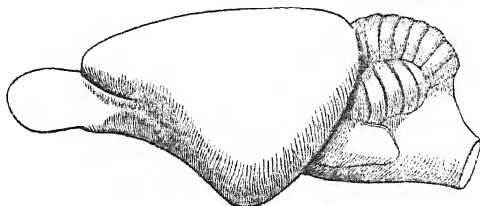
The aortic arch divides as in man, giving off a right innominate, a left carotid, and a left subclavian. There are two independent innominate veins, right and left.

The lungs are deeply divided into three main lobes on each side, whilst on the right the extra azygos triangular lobe is also found, not so large as any of the others.

Through the kindness of our President, I have had the opportunity of dissecting a female specimen of *Tupaia tana*, where there is a feebly developed sublingua, a less globose stomach, a lengthy thin-walled small intestine, *no trace of a cæcum*, and a thick-walled large intestine 3·25 inches long, quite easily distinguishable as such. The caudate lobe of the liver is much larger proportionately than in *T. belangeri*. In that there is no umbilical fissure, whilst that of the gall-bladder is very deep, the two species agree.

Dr. Günther has also permitted me to eviscerate a Bornean specimen of *Tupaia splendidula* in the National Collection. Its liver is constructed on a plan identical with that of the two other species, the left lateral lobe being much the largest, the umbilical fissure

Fig. 1.



Brain of *Tupaia belangeri*; lateral aspect.

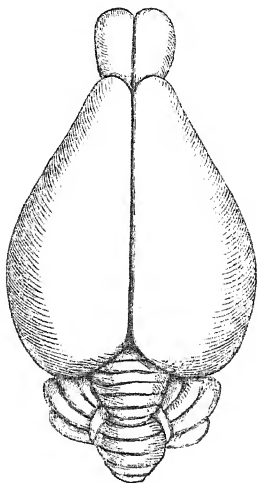
nearly obsolete, the cystic fissure deep, and the Spigelian lobe bifid. The caudate lobe, however, is long and narrow. The colon was very much distended, and with it the cæcum, so that the ileo-cæcal valve appeared to be situated at the side of the dilated colon, near to the blind extremity. If there had been no enlargement I should infer, from inspection, that the cæcum is normally less than half an inch in length.

The brain of *Tupaia belangeri* is smooth on its surface, and otherwise much resembles that of *Solenodon*<sup>1</sup>, *Rhynchocyon*, *Petro-*

<sup>1</sup> "Ueber die Säugethiergattung *Solenodon*," pl. ii., Abhandlungen der k. Akad. der Wiss. zu Berlin.

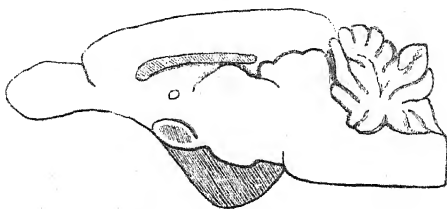
*dromus*, and *Macroscelides*, as figured by Dr. Peters<sup>1</sup>. It is broadest a little behind its middle, from which it narrows gradually in front, more rapidly behind, so as to be pyriform in general outline when

Fig. 2.

Brain of *Tupaia belangeri*; superior aspect.

seen from above. No trace of any convolutions can be detected. The olfactory lobes are considerable in size, longer than broad. Each hemisphere is very slightly convex from before backwards, its

Fig. 3.

Brain of *Tupaia belangeri*; mid-longitudinal section.

outline forming the base of the triangular side view of the organ, the two other sides of which are of nearly equal length, so that its deepest part is at about its middle.

The corpus callosum is thin and nearly straight. It continues forward to within one sixth of the length of the hemisphere from its

<sup>1</sup> Reise nach Mossambique, 1852, pl. xxiv. figs. 10, 12, 13.

anterior margin. The corpora quadrigemina are large, especially in front.

The cerebellum is just overlapped at its anterior border by the back of the cerebral hemispheres; otherwise it is quite posterior.

The several lemurine resemblances of *Tupaia* makes the simplicity of its cerebral surface somewhat surprising.

5. Notes on the Anatomy of *Helictis subaurantiaca*. By A. H. GARROD, M.A., F.R.S., Prosector to the Society.

[Received March 10, 1879.]

(Plate XXIX.)

A specimen of *Helictis subaurantiaca*, from China, purchased by the Society on Nov. 26, 1874<sup>1</sup>, having died on Nov. 29, 1878, I take the present opportunity of recording some of the most important facts in its visceral anatomy, more on account of the rarity of the animal in this country, than because it presents peculiarities of any kind.

It may first be noticed that the skins of this species collected by Mr. Swinhoe, and now in the national collection, seem to have faded very much in their underparts, which, quite in opposition to that naturalist's original account of his species, are a pure white. It may further be mentioned that *Helictis* is extremely Badger-like in its proportions, gait, and odour.

On comparing the skull of the Society's specimen with the small collection of skulls of the genus in the national collection, I found no small difficulty in detecting any intimate resemblance to any. In most of its measurements it agrees exactly with those of *H. moschata*, as recorded by Dr. Gray<sup>2</sup>.

In the Society's specimen the skull retained no trace of any sutures, and the lower jaw was considerably diseased, apparently in association with decay of the teeth. I hardly think, however, that extreme old age will account for the peculiarities of the individual under consideration. It differs from other specimens of *H. moschata* and *H. subaurantiaca*, and much more resembles *H. nipalensis* and *H. orientalis*, in that its zygoma is massive, the premaxillary region short as well as comparatively broad, and the mid-parietal area between the upper margins of the temporal muscular origins decidedly broad. The premolar and molar teeth are heavier than in *H. moschata* and *H. subaurantiaca*, lighter than in *H. nipalensis* and *H. orientalis*, with the two former of which species it most agrees in the size of the zygomatic foramen, with the two latter in its situation.

<sup>1</sup> Vide P. Z. S. 1874, p. 666.

<sup>2</sup> Catalogue of Carnivorous, Pachydermatous, and Edentate Mammalia in the British Museum, 1869, p. 143.

The following were the measurements, taken a few hours after death :—

	inches.
Tip of nose to base of tail . . . . .	14·25
Tail . . . . .	6·9
Ear . . . . .	1·4
Tip of nose to occipital ridge . . . . .	3·8
Sex, female.	

The two pairs of inguinal nipples are widely separate, forming the four corners of a square.

The clavicles are reduced, each ·3 inch long, the scapular extremities remaining.

The tongue is covered with small, similar, retroverted filiform papillæ, with a fair scattering of fungiformes. The papillæ circumvallatæ, two on the left, three on the right, and one in the angle, form the usual V.

The right lung has four lobes, one being the azygos. On the left side there only two lobes.

The stomach is exactly like that of *Arctictis binturong* (as figured by me<sup>1</sup>) and nearly all Carnivora when contracted. The small intestine is seven feet in length, the large intestine six inches and three quarters. There is no cæcum; but an abrupt change in the nature of the mucous membrane from thin and villous to thick and smooth indicates the junction of the tubes.

The liver conforms completely to the carnivorous type, the right central lobe being largest, with a deep cystic fissure, and a gall-bladder so deeply imbedded that its fundus is seen on the diaphragmatic surface of the organs. The left lateral lobe comes next in size, the right central, and then the caudate following, after which the left central lobe, and the small Spigelian last.

The pancreas is seven inches in length, its left terminal two inches being in relation with the narrow spleen (two and three quarters inches in length).

There is a pair of pea-sized anal glands, opening into the rectum near the sphincter, in a linear transverse orifice on either side.

The uterus is strongly bicorn; the vulva much enlarged, with a well developed gland on each side of the orifice of the meatus urinarius.

The brain conforms to the Musteline Carnivorous type, not to that of most of the Arctoidea. In Prof. Flower's excellently concise definitions of the three different arrangements of the cerebral convolutions in the Carnivora<sup>2</sup>, he tells us that "in the *Arctoidea* the fissure of Sylvius is rather long, and slopes backwards; the inferior gyrus has the limbs long, corresponding with the length of the Sylvian fissure, the anterior rather narrower than the posterior (especially in the true Bears); the middle gyrus is moderate and equal-limbed, the upper one large, very broad in front, and distinctly marked off from the second posteriorly as far as near the lower

<sup>1</sup> P. Z. S. 1873, p. 198.

<sup>2</sup> P. Z. S. 1869, p. 482.



border of the temporal lobe (§). The crucial fissure is long and oblique, and situated further back than usual." In the footnote (§) we read, "Except in the smaller numbers of the genus *Mustela*, where the sulcus separating the superior from the middle gyrus is less produced posteriorly than in others of the group. In *Galictis vittata*, however, the brain is quite a miniature of that of a Bear; but the middle convolution is united with the upper one at its superior anterior angle.

Fig. 1.

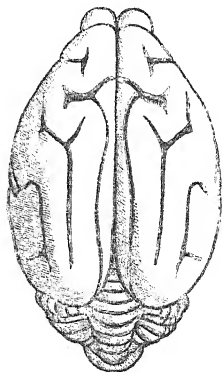
Brain of *Helictis subaurantiaca*; superior aspect.

Fig. 2.

Brain of *Helictis subaurantiaca*; lateral aspect.

In *Helictis*, as also in *Ictonyx zorrilla*, the superior gyrus ceases at the superior posterior angle of the hemisphere, as in *Mustela*. The anterior limb of the inferior gyrus is extremely narrow, especially near its upper end, where it becomes almost hidden by the corresponding part of the posterior limb of the same gyrus. A small sulcus tends to divide the transverse part of the middle gyrus from its posterior limb.

Most peculiarly, in *Helictis* there is no crucial fissure, because the hippocampal gyrus appears upon the superior aspect of the brain. This is the case in no other carnivorous animal with which I am acquainted, but occurs in *Moschus*, *Cervus pudu*, and other smaller Ruminantia.

April 1, 1879.

Prof. W. H. Flower, LL.D., F.R.S., President, in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the month of March 1879 :—

The total number of registered additions to the Society's Menagerie during the month of March was 63, of which 28 were by presentation, 3 by birth, 22 by purchase, 7 were received on deposit, and 3 by exchange. The total number of departures during the same period, by death and removal, was 98.

The most noticeable additions during the month of March were as follows :—

1. A young male of the Mule Deer of North America (*Cariacus macrotus*), obtained from Dr. J. D. Caton, of Ottawa, Illinois, U. S. A., and received March 12. Through the kind intercession of the Secretary of the Smithsonian Institution, Judge Caton has been induced to send us our first example of this peculiar Deer, of which we may hope shortly to receive hinds also, by the aid of kindly promised assistance from the same influential quarter.

2. A male Sumatran Rhinoceros, deposited March 20th.

This is the first *male* of the Sumatran Rhinoceros that we have yet received, the examples previously exhibited in the Society's Gardens having been all of the female sex. In general appearance this specimen presents all the characters of the *Rhinoceros sumatrensis* as distinguished from *R. lasiotis*.

The Secretary read the following extracts from a letter addressed to him by Mr. Carl Bock, dated Padang Panjang, Sumatra, Jan. 24, 1879.

"The *Capricornis sumatrensis*, or 'Mountain-Antelope' as you very properly call it, I have been on the look-out for ever since I left Padang; I was told by several there it has never reached Europe alive. It is sparingly distributed over the mountains here in the highlands proper; the best district is Lolo, where I spent more than one month, and had two men all the time in the most inaccessible parts purposely to catch some 'Kambing-utan,' as the Malays call the animal. I succeeded in getting a *young* male of perhaps 10 to 12 months. I have named him '*Lolo*.' I give you an extract from what I have noted down about the animal.

"The 'Kambing-utan' or wild Goat, when I first saw the animal, struck me as not being like a Goat at all; his form and outline more resemble that of a young Reindeer. He is a young male of perhaps ten months to a year old; his colour is jet-black; he has long coarse hair, and a mane of stiff hair of a whitish grey colour; the length of the hairs ranging from 3 to 4 inches. His ears are thinly covered inside with white hairs, on the outer side of brown colour, mixed with black; the ears are remarkably long and erect; when he listens he bends them quite forward past the horns; the latter are

straight, and from the root to about the middle there is a deep furrow in each. In the old animals the horns (of which I have several pairs) are curved, and halfway up are furnished with a number of rings, which, again, are striated longitudinally; the apex is quite smooth. All the horns I purchased were more or less covered with earth and bark firmly rooted between the wrinkles. The eyes have rather the appearance of revenge than that gentle and mild expression so common among the Deer. An inch below the eyes, in a lateral line, are on each side a glandular opening or lacrymal passage, from which now and then (especially when the animal is irritated) an oily substance of a white colour is secreted, which hardens and becomes dark when exposed to the air. My specimen has slight traces of a beard coming. I am told by the Malays that the old males have a long beard. His scrotum is large and covered with white hair. He is a powerful animal, but appears by no means very active, and moves about very slowly. In their wild state they live upon buds and leaves. I am trying to domesticate my specimen; he does not now get many leaves from the forest, but 8 or 10 pisangs a day; these he is very fond of. Before commencing to eat he blows and scents at the food for a few minutes. I have noticed that he does not drink any water; but I always let my cook throw a quantity of water over the leaves. I hope to procure a female as companion for him; then I think they will live in bondage, especially as they have been caught young. I have several persons in different parts of the highlands looking out for the Mountain-Antelopes, and have offered good rewards for a female; unless I move to another island I will bring the Kambing-utan to England under my own care, as 'Lolo' knows me pretty well, for I feed him every day."

Mr. Sclater exhibited the eggs of birds collected by the naturalists of the 'Challenger' Expedition, which had been arranged in order in 18 glass-topped boxes.

The whole series consisted of about 250 eggs referable, so far as they could be determined, to about 50 species, as follows:—

*List of Eggs collected during the 'Challenger' Expedition.*

a. PASSERES.		No. of
	Locality.	Eggs.
1. <i>Phrygilus melanoderus</i> ( <i>Q. et G.</i> )? .....	Falklands.	2
2. <i>Turdus falklandicus</i> , <i>Q. et G.</i> ? .....	"	2
3. <i>Anthus correndera</i> , <i>Vieill.</i> .....	"	2
b. ACCIPITRES.		
4. <i>Milvago australis</i> ( <i>Gm.</i> )? .....	Falklands.	2
5. <i>Buteo erythronotus</i> ( <i>King</i> )? .....	"	2
6. <i>Cathartes aura</i> ( <i>Linn.</i> ) .....	"	2

## c. STEGANOPODES.

	Locality.	No. of Eggs.
7. <i>Phalacrocorax verrucosus</i> (Cab.)	Kerguelen.	10
8. <i>Phalacrocorax albiventris</i> (Less.)	Falklands.	3
9. <i>Sula leucogastra</i> (Bodd.)	Raine Island.	1
10. <i>Sula cyanops</i> , <i>Sund.</i>	"	1
11. <i>Sula piscator</i> (Linn.)	"	1
<i>Sula</i> , sp. inc.	"	9
12. <i>Phaeton æthereus</i> , <i>Linn.</i>	Bermuda.	4
13. <i>Fregata aquila</i> (Linn.)	Ascension.	5

## d. HERODIONES.

14. <i>Nycticorax obscurus</i> , <i>Bp.</i>	Falklands.	2
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## e. ANSERES.

15. <i>Chloephaga magellanica</i> (Gm.)	Falklands.	2
16. <i>Bernicla antarctica</i> (Gm.)	"	2
17. <i>Tachyeres cinereus</i> (Gm.)	"	2
" "	Elizabeth Island.	1
18. <i>Querquedula eatoni</i> , <i>Sharpe</i>	Kerguelen.	7
19. <i>Querquedula flavirostris</i> (Vieill.)	Falklands.	2
20. <i>Anas cristata</i> , <i>Gm.</i>	"	2

## f. COLUMBÆ.

21. <i>Carpophaga rhodinokema</i> , <i>Scl.</i>	Admiralty Islands.	3
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## g. GALLINÆ.

22. <i>Numida meleagris</i> , <i>Linn.</i>	Ascension.	2
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## h. LIMICOLÆ.

23. <i>Chionis minor</i> , <i>Hartl.</i>	Kerguelen.	8
24. <i>Haematopus</i> , sp. inc.	Falklands.	2
25. <i>Gallinago frenata</i> (Mar.)?	"	2
26. <i>Eudromias modesta</i> (Licht.)	"	2

## i. GAVIÆ.

27. <i>Sterna fuliginosa</i> , <i>Gm.</i>	Raine Island.	15
" "	Ascension.	7
28. <i>Sterna hirundinacea</i> (Less.)	Elizabeth Island.	16
29. <i>Sterna</i> , sp. inc.	Herd Island.	1
30. <i>Anous stolidus</i> (Linn.)	Raine Island.	9
31. <i>Larus dominicanus</i> , <i>Licht.</i>	Kerguelen.	1
" " "	Elizabeth Island.	2
" " "	Falklands.	2
32. <i>Larus</i> , sp. inc.	"	2
33. <i>Stercorarius antarcticus</i> (Less.)	Nightingale Island.	4
" "	Falklands.	2
34. <i>Diomedea exulans</i> , <i>Linn.</i>	Kerguelen.	1
" "	Marion Island.	3
35. <i>Diomedea</i> , sp. inc.	Nightingale Island.	1
36. " "	Tristan d'Acunha.	3
37. <i>Diomedea melanophrys</i> , <i>Temm.</i>	Falklands.	3
38. <i>Majaqueus æquinoctialis</i> (Linn.)	Kerguelen.	2
39. <i>Cestrelata lessoni</i> (Garn.)?	"	10
40. <i>Daption capensis</i> (Linn.)?	"	1
41. <i>Prion desolatus</i> (Gm.)	"	21

	Locality.	No. of Eggs.
42. Pelecanoides garnoti ( <i>Less.</i> ) .....	Kerguelen.	1
" " " " " " " " " " " " " " " "	Falklands.	2
43. Fregetta melanogastra ( <i>Gould</i> ) ? .....	Kerguelen.	1
" " " " " " " " " " " " " " " "	Falklands.	1

*j.* IMPENNES.

44.	Aptenodytes longirostris, <i>Scop.</i>	Marion Island.	1
45.	Aptenodytes, sp. inc. (?)	Herd Island.	5
46.	Eudyptes chrysolophus ( <i>Brandt</i> )	Falklands.	2
	" "	Kerguelen.	4
47.	Eudyptes chrysocome ( <i>Forst.</i> )	Falklands.	2
	" "	Inaccessible Island.	6
48.	Pygosceles tæniatus ( <i>Peale</i> )	Falklands.	7
49.	Spheniscus magellanicus ( <i>Forst.</i> )	"	2

## k. CRYPTURI.

50. *Calodromas elegans* (*d'Orb. & Geoffr.*) ..... Falklands. 2

Mr. J. W. Clark, F.Z.S., exhibited a drawing of a species of *Lagenorhynchus* lately taken off Ramsgate.

Mr. Clark described the coloration of the animal, which was a male, nearly if not quite adult; and showed that it agreed in the main with that of a young *Delphinus* described by him two years ago, and referred with some doubt to *Lagenorhynchus albirostris* (P. Z. S. 1876, p. 686).

Mr. St. G. Mivart, F.R.S., exhibited a figure of a Kestrel (*Tinnunculus alaudarius*) shot by the Marquis de Warrin of Brussels, in the Ardennes, and preserved in his collection there. The bird had on each leg an extra toe, placed very high up, and provided with a long and quite straight and pointed claw.

The following papers were read :—

1. A Contribution to the Avifauna of the Sooloo Islands.  
By R. BOWDLER SHARPE, F.L.S., F.Z.S., &c., Senior  
Assistant, Department of Zoology, British Museum.

[Received March 18, 1879.]

The present collection was formed by Mr. F. W. Burbidge during a short stay in the Sooloo Islands, a most interesting locality to the ornithologist, and one of which very little is known. In my paper on Dr. Steere's collections from the Philippines, I noticed the four species of birds as yet recorded from the Sooloo Islands<sup>1</sup>, and I ought to have added the common *Artamus* of the Indo-Malayan region, and a Cuckoo, both recorded by Peale from Mangsi.

In addition to the birds obtained by Mr. Burbidge, I have received

<sup>1</sup> See Trans. Linn. Soc. n. s. i. p. 310.

permission from the authorities of the Oxford Museum to describe the large Bornean collections forwarded to that institution by Mr. W. H. Treacher, Acting Governor of Labuan. Amongst them are a few birds from Sooloo, but apparently not the result of a separate expedition, but presented to Mr. Treacher by Mr. Burbidge. To the latter gentleman I am indebted for the following notes. "Among the birds which I saw in Sooloo, but could not secure, I would particularly mention:—some Hornbills, seemingly the common black-and-white small kind from Labuan; a fine white Harrier, with black tips to the wings (this is a distinct and handsome bird, not unfrequently seen circling over rice-fields or grassy plains); the 'fire-backed' Pheasant; and an Owl, apparently a larger and brighter-coloured edition of our Common Barn-Owl or Screeching species. The blue, white-ringed Kingfisher (*Halcyon chloris*) of Labuan is very common here, as is also the rufous, white-headed Scavenger Hawk or Eagle<sup>1</sup>; and at least two other species, both larger, are to be found looking out for food near the wharf at Meimbong. Curlews are as plentiful here as in Sarawak and other parts of Borneo. I missed the nocturnal 'chuck-chuck' of the Goatsucker, so common in Labuan. Water-Rails and a pretty blue Kingfisher are not uncommon by the margin of the Meimbong river, which is close to the harbour, and is an excellent shooting-ground. Gun-boats often come here; and as the country is now readily accessible, much might doubtless be done in ornithology. Capital angling may be had in this little river; and there is a good bathing place near the town and close to the market, where one may be entirely free from the fear of an Alligator lurking about in wait for a meal. Now and then the Sultan and his court, male and female, together with all the principal people in the island, meet to enjoy the fun of Pig-hunting, the Wild Boar being very plentiful here, together with two or three species of Deer. These Pigs do a good deal of damage to cultivated crops; so that now and then a regular field-day is organized, and nearly every man, pony, dog, and spear in the island are out, versus 'Piggy,' as many as fifty of the latter being slain in a single day. There are so many kinds of sport easily attainable here, provisions of the best are so cheap, a pony may be hired for about 1s. 6d. a day, and there is so much that is novel to be seen about the towns and the court, that the wonder is that some traveller, fond of sport and especially ornithology, does not take up his quarters here for a month or two—and particularly as the place is easily reached from Singapore *via* Labuan, or from Hong-Kong, *via* Manila."

Mr. Burbidge left England on a botanical expedition organized by Messrs. H. Veitch and Son; and his success in this department of natural history is well known. His chief attention having been devoted to plants, it only remains to thank him for the intelligent way in which he devoted his scanty leisure time to forming the present collection of birds.

The following I believe to be a correct list of Sooloo birds as at present known; and I have included the few species mentioned by

<sup>1</sup> Doubtless *Haliastur intermedius*.

Peale as procured in Mangsi by the United States Exploring Expedition. I have also added the references to Lord Tweeddale's recent papers on the Philippine collections of Mr. Alfred Everett, and have given the ranges of the different species in the Philippine archipelago, so as to bring the subject up to the present date.

### 1. CACATUA HAMÆTUROPYGIA (P. L. S. Müll.).

*Cacatua hamæturopygia*, Wald. Tr. Z. S. ix. p. 132; Sharpe, Tr. Linn. Soc. n. s. i. p. 312; Tweedd. P. Z. S. 1877, pp. 756, 817; 1878, pp. 107, 281, 340, 379.

Two specimens.

[Luzon (*Meyer*); Guimaras (*Meyer*); Negros (*Meyer*, *Steere*, *Everett*); Zebu (*Everett*); Leyte (*Everett*); Nipah (*Everett*); Panaon (*Everett*); Butuan River, N. Mindanao (*Everett*); Sooloo (*Burbridge*).]

### 2. PRIONITURUS DISCURUS (V.).

*Prioniturus discurus*, Wald. Tr. Z. S. ix. p. 132; Sharpe, Tr. Linn. Soc. n. s. i. p. 312; Tweedd. P. Z. S. 1877, pp. 538, 688, 756, 817, 1878, p. 379.

A single specimen, agreeing with others in the British Museum from the Philippine Islands.

[Luzon (*Meyer*, *Everett*); Negros (*Steere*); Zebu (*Everett*); Panaon (*Everett*); Mindanao (*Cuming*, *Everett*, *Murray*); Basilan (*Steere*); Sooloo (*Burbridge*); Balabak (*Steere*).]

### 3. TANYGNATHUS LUCIONENSIS (L.).

*Tanygnathus lucionensis*, Wald. Tr. Z. S. ix. p. 133; Sharpe, Tr. Linn. Soc. new series, i. p. 312; Tweedd. P. Z. S. 1877, pp. 538, 756, 817, 1878, pp. 281, 340, 612.

A single specimen collected by Mr. Burbridge, and exactly resembling the specimens from Manila and from Palawan in the British Museum.

[Luzon (*Meyer*); Guimaras (*Meyer*); Negros (*L. C. Layard*, *Steere*, *Everett*); Cebu (*Everett*); Leyte (*Everett*); Mindanao (*Steere*, *Everett*); Malanipa (*Murray*); Sooloo (*Burbridge*, *Peale*); Palawan (*Steere*, *Everett*).]

### 4. TANYGNATHUS BURBIDGII, sp. n.

*Similis T. muelleri*, ex Celebes, sed dorso toto sordide prasino, capite flavicanti-viridi et alis omnino viridibus distinguendus.

This fine new species of *Tanygnathus* is closely allied to *T. muelleri* of Celebes and *T. everetti* of Mindanao. It differs from *T. muelleri* in having the back green instead of yellow, while the head is yellowish green and not emerald green; there is also no blue on the wing-coverts, the whole wing being green.

The following is a full description of the bird.

*Adult* General colour above dark grass-green, including the hind neck, entire mantle, and scapulars; wings a little lighter green, the

wing-coverts and secondaries with narrow yellow margins, the primaries blackish on the inner web, externally dark grass-green with a slight blue shade along the shaft, the first primary black shaded with blue on the outer web; entire back and rump deep cobalt-blue; upper tail-coverts green, slightly shaded with yellow on the margins; tail-feathers dark green, with a narrow margin of yellow at the tip, the under surface of the tail golden yellow; head yellowish green, the sides of the face also of this colour; the under-surface of the body bright grass-green, yellow on the throat and fore neck and passing into green on the breast and abdomen; under wing-coverts and under tail-coverts of the same green as the breast, with yellow margins; quills ashy blackish below. Total length 15.5 inches, culmen 1.8, wing 8.6, tail 6.4, tarsus 0.65.

On comparing *T. burbidgii* with *T. everetti*, one is struck at once by the larger size of the former and its yellowish green head, the crown being emerald-green in *T. everetti*, which also has the wing only 7.55 inches in length (Samar: *Mus. Brit.*). None of the Sooloo birds, of which there are five in the collections, have the feathers of the mantle edged with blue as in the Samar individual.

#### 5. ELANUS HYPOLEUCUS, Gould.

*Elanus hypoleucus*, Sharpe, Cat. B. i. p. 338; Wald. Tr. Z. S. ix. p. 142; Tweed. P. Z. S. 1877, p. 757.

An adult specimen: wing 11.5 inches.

[Luzon (*Jagor*); Cebu (*Everett*); Sooloo (*Burbidge*); N.W. Borneo (*Treacher*).]

#### 6. SCOPS RUFESCENS (Horsf.).

*Scops rufescens*, Sharpe, Cat. B. iii. p. 102.

One specimen.

This bird seems to me to differ slightly from Bornean and Malaccan examples in having a much darker face, the ear-coverts shaded with black. I do not, however, propose to found a new species on a single example, and must wait for more specimens. The measurements of the Sooloo bird are as follows:—Total length 7 inches, culmen 0.7, wing 4.8, tail 2.6, tarsus 0.85. It will be seen that they are a good deal inferior to those of the type of *Scops mantis*, as given by me in the 'Catalogue.'

#### 7. CUCULUS FUCATUS, Peale.

*Cuculus fucatus*, Peale, U.S. Expl. Exp. Zool. 1848, p. 136.

*C. tenuirostris*, Less.; Cass. U.S. Expl. Exp. p. 244.

This Cuckoo may be *Cuculus himalayanus*, which has recently been shot in Labuan by Governor Ussher; but it is difficult to decide without seeing a specimen. At present the species is only known from the plate and description given by Peale, who procured it on the island of Mangsi.

#### 8. ARTAMUS LEUCORHYNCHUS (L.).

*Artamus leucorhynchus*, Walden, P. Z. S. ix. p. 174; Sharpe, Tr.



Linn. Soc. new series, i. p. 323; Tweedd. P. Z. S. 1877, pp. 544, 692, 759, 826, 1878, pp. 283, 342.

*A. leucogaster* (Valenc.); Sharpe in Rowley's Orn. Misc. iii. p. 179.

One specimen.

[Luzon (*Meyer*); Guimaras (*Meyer*); Negros (*Meyer*, *Everett*); Cebu (*Murray*, *Everett*); Leyte (*Everett*); Mindanao (*Everett*, *Steere*); Sooloo (*Burbridge*); Mangsi (*Peale*).]

#### 9. *ORIOLOUS CHINENSIS*, L.

*Oriolus chinensis*, Sharpe, Cat. B. iii. p. 203.

*O. suluensis*, Sharpe, tom. cit. p. 205.

*Broderipus acrorhynchus* (Vig.); Walden, Tr. Z. S. ix. p. 185; Tweedd. P. Z. S. 1877, pp. 545, 694, 760, 826, 1878, pp. 110, 285, 342, 380.

The receipt of three more specimens from Mr. Burbridge convinces me that the Sooloo-Islands bird, which I thought was a race of *O. frontalis*, Wall., from the Sula Islands, is not really specifically separable from the common Oriole of the Philippines, called by me *Oriolus chinensis* and by Lord Tweeddale *Broderipus acrorhynchus*. A further comparison of the series seems to show that *O. frontalis* of Wallace, from the Sooloo Islands, is scarcely to be distinguished from *O. chinensis*, the only difference being the slightly greater extent of yellow on the tail-feathers in the latter bird.

[Luzon (*Meyer*); Panay (*Murray*); Guimaras (*Meyer*); Negros (*Meyer*, *Steere*, *Everett*); Cebu (*Meyer*, *Murray*, *Everett*); Leyte (*Everett*); Panaon (*Everett*); Dinagat (*Everett*); Mindanao (*Steere*, *Murray*, *Everett*); Sooloo (*Burbridge*); Si Butu (*Low*); Balabac (*Steere*).]

#### 10. *CORONE PHILIPPINA* (Bp.).

*Corone philippina*, Sharpe, Cat. B. iii. p. 42; id. Tr. Linn. Soc. n. s. i. p. 343.

*Corvus philippinus*, Bp.; Wald. Tr. Z. S. ix. p. 201; Tweedd. P. Z. S. 1877, pp. 548, 698, 763, 831, 1878, pp. 113, 287, 343, 381.

Three specimens.

[Luzon (*Cuming*, *Meyer*, *Everett*); Cujo (*Meyer*); Panay (*Murray*); Negros (*Meyer*, *Steere*, *Everett*); Cebu (*Everett*); Leyte (*Everett*); Panaon (*Everett*); Camiguin (*Murray*); Dinagat (*Everett*); Mindanao (*Murray*, *Everett*); Sooloo (*Burbridge*).]

#### 11. *SARCOPS LOWII*.

*Sarcops lowii*, Sharpe, l. c. p. 344.

Several specimens collected by Mr. Burbridge confirm the distinctness of this species from *S. calvus*.

#### 12. *OSMOTRERON VERNANS* (L.).

*Osmotreron vernans*, Wald. Tr. Z. S. ix. p. 210; Sharpe, Tr. Linn. Soc. n. s. i. p. 346; Tweedd. P. Z. S. 1877, p. 764, 1878, p. 623.

A female specimen.

[Luzon (*Meyer*); Panay (*Steere*); Zebu (*Everett*); Sooloo (*Burbridge*); Palawan (*Steere*).]

13. *OSMOTRERON AXILLARIS* (Gray).

*Osmotreron axillaris*, Walden, Tr. Z. S. ix. p. 211; Sharpe, Tr. Linn. Soc. ix. p. 346; Tweed. P. Z. S. 1877, pp. 549, 699, 764, 832, 1878, pp. 113, 287.

An adult specimen.

[Luzon (*Meyer, Everett*); Guimaras (*Meyer*); Panay (*Murray*); Negros (*Meyer, Steere, Everett*); Cebu (*Everett*); Dinagat (*Everett*); Mindanao (*Steere, Everett*); Sooloo (*Burbridge*).]

14. *CARPOPHAGA AENEAE* (L.).

*Carpophaga aenea*, Wald. Tr. Z. S. ix. p. 215; Sharpe, Tr. Linn. Soc. n. s. i. p. 346; Tweed. P. Z. S. 1877, pp. 764, 832, 1878, pp. 113, 288, 344, 623.

One specimen.

[Luzon (*Meyer*); Negros (*Meyer, Steere, Everett*); Cebu (*Everett*); Leyte (*Everett*); Dinagat (*Everett*); Mindanao (*Everett*); Sooloo (*Burbridge*); Palawan (*Steere, Everett*).]

15. *CARPOPHAGA PICKERINGI*.

*Carpophaga pickeringi*, Cass. Pr. Philad. Acad. 1854, p. 228; id. U.S. Expl. Exp. p. 267, pl. xxvii.; Sharpe, Tr. Linn. Soc. n. s. i. p. 353.

Procured by the United-States Exploring Expedition in the island of Mangsi.

16. *IANTHÆNAS GRISEIGULARIS*, Wald. et Layard.

*Ianthænas griseigularis*, Wald. Tr. Z. S. ix. p. 218; id. P. Z. S. 1878, p. 288.

One specimen.

I refer this Pigeon with some hesitation to *I. griseigularis*, of which I have never seen a specimen, and only know it from Mr. Keuleman's figure in the Ibis for 1872 (pl. vi.). On the other hand, it is very closely allied to *I. albigularis* of the Moluccas, but differs in the greyish shade on the white throat, which is also more restricted, and in the forehead being grey with only a slight mark of lilac.

17. *CALCENAS NICOBARICA* (L.).

*Calcenas nicobarica*, Cass. U.S. Expl. Exp. p. 276; Sharpe, P. Z. S. 1875, p. 110.

Observed on Mangsi in some abundance by the U.S. Exploring Expedition.

18. *PTILOPUS MELANOCEPHALUS*.

*Ptilopus melanocephalus* (Gm.); Elliot, P. Z. S. 1878, p. 551.

An adult specimen.

19. *MACROPYGIA TENUIROSTRIS*, Gray.

*Macropygia tenuirostris*, Walden, Tr. Z. S. ix. p. 218; Sharpe, Tr. Linn. Soc. new ser. i. p. 347.

Two specimens.

[Luzon (*Meyer*); Basilan (*Steere*); Sooloo (*Burbidge*).]

Lord Tweeddale differs from Professor Schlegel's opinion that the same Philippine species is found in Java and Lombok, where it is *M. emiliana* of Bonaparte; but having compared several specimens lately, I believe that the Professor's view is the right one, and that the bird is found over the Philippines, and occurs even in Borneo. Lord Tweeddale separates the Negros bird as *M. eurycerca*.

20. *GALLUS STRAMINEICOLLIS*, sp. n.

General colour above black, shot with green and purple; wing-coverts like the back, the innermost and the scapulars with a slight subterminal shine of coppery brown; primary-coverts and primaries black, the secondaries externally green; feathers of the lower back and rump straw-yellow, with darker longitudinal centres of black or green; upper tail-coverts and tail glossy oil-green; crown of head and nape black; hind neck and neck-hackles, as well as sides of neck, straw-yellow, deeper on the hind neck, with green longitudinal centres to the feathers; remainder of under surface of body black with a green gloss; comb short and rounded; sides of face and entire throat bare. Total length 34·5 inches, culmen 1·1, wing 9·0, tail 17·5, tarsus 3·4.

Mr. Burbidge procured a single example of this Jungle-fowl, which appears to be a very distinct species. He tells me that it was brought to the ship by one of the Sooloo natives alive, and he cannot vouch for its having been a wild bird. I have, however, shown the bird to Mr. Gould and other ornithologists; and they agree with me that it is probably a distinct species of Jungle-fowl. Governor Ussher also has seen the bird; and he tells me that he has never seen any domesticated Fowls in Borneo or the Eastern Islands which approached this species in the least.

2. A List of the Birds of Labuan Island and its Dependencies. By R. BOWDLER SHARPE, F.L.S., F.Z.S., &c., Senior Assistant, Department of Zoology, British Museum.

[Received March 28, 1879.]

(Plate XXX.)

The materials for a list of Labuan birds have been considerable. First of all there is the little work<sup>1</sup> on the natural history of the

<sup>1</sup> Contributions to the Natural History of Labuan and the adjacent Coasts of Borneo. By James Motley of Labuan, and L. L. Dillwyn. Part 1. 8vo, 1855.

island published in 1855 by Messrs. Motley and Dillwyn, which gives 45 species as the number collected by the former of these gentlemen<sup>1</sup>. Secondly, I have examined two large collections sent by the Hon. Hugh Low; and in 1875 I contributed to the 'Proceedings' of this Society a paper on the first of these which had been submitted to me<sup>2</sup>. As in the case of Mr. Motley's collections, an exact record was not kept of the birds which inhabited Labuan as distinct from those which came from the mainland of N.W. Borneo; and it turns out that many of the species recorded by me in the paper above mentioned are not inhabitants of Labuan at all. The second collection sent by Mr. Low was still more extensive, but contained no exact indications of locality excepting in a few rare instances; I was, however, able to obtain some particulars from Mr. Low during his visit to England before his departure for Perak, where he is now the British Resident. Previous to the two consignments here alluded to, Mr. Low had sent several collections to England, all of which were dispersed by his agents on every occasion as from Labuan; and specimens are doing duty in many Museums and private cabinets which ought to be labelled as from Lumbidan or the adjacent parts of North-western Borneo, and not from the island of Labuan.

On being appointed to the governorship of Labuan, my old friend Governor Ussher at once set to work exploring the ornithology of his dominion, and, with his usual zeal, speedily sent a large series of skins to my care at the British Museum. This series embraced collections from several localities, all carefully separated and indorsed, the most complete being that from Labuan itself, where the Governor is a resident, and where he has worked personally and by means of trained collectors, many of the latter being educated to the work by Mr. Low. The present list may therefore be considered perfectly authentic, every specimen being ticketed by Governor Ussher himself. Before turning to the personal notes of the latter gentleman, a great tribute is due to Mr. Low for his last collection from Borneo, which contained a very large series of eggs and nests taken with the parent birds by his trained hunters, and described in this and the paper which I have sent to the 'Ibis' on the birds of Lumbidan.

The following is Governor Ussher's account of his collections:—

"The skins are nearly all in good order, and were chiefly collected by a Kadyan youth of the name of Būak, whom I taught to shoot, having purchased a light gun for him. I am indebted to the Hon. Hugh Low, late Police-magistrate here, and now Resident in Perak, for having instructed several of these boys in skinning birds.

"The island of Labuan is about six miles from Borneo at the nearest point. The colony comprises the undermentioned islands, viz., Labuan, Daat, Karāman, Pappan, Great and Little Rusūkan, Burong, Enoe, and one or two nameless islets of diminutive size.

<sup>1</sup> It is probable, however, that some of the birds were from the mainland; and I only refer to those whose existence has been confirmed by the more recent collectors.

<sup>2</sup> "On a Collection of Birds from Labuan. By R. Bowdler Sharpe," P. Z. S. 1875, pp. 99–111, pl. xxii.

"Labūan itself is about ten miles in extreme length and four in breadth, and contains about 47 square miles. Daat contains probably about seven hundred acres, principally of fine forest; Pappan about sixty acres; Karāman is of about the same size as Daat, the two Rusūkans being each smaller than Pappan, while Burong and Enoe are mere tufts of rock and forest in the sea. All the islands are finely timbered, though the forest on Labūan has been ruthlessly burnt for 'padi' planting. Burong Island is composed entirely of limestone—and is rather famous for possessing great numbers of a very venomous and spiteful-looking serpent of a brilliant emerald-green, which is generally found coiled round boughs at a few feet from the ground, and is usually motionless until disturbed. On Labūan and Daat Wild Boar are still to be found; and on Daat alone the interesting *Semnopithecus nasica* exists, which has not been observed on the other islands. Daat is not more than a mile and a half from the coast of Borneo, between it and Labūan; it is probable that Bornean forms may be met with more frequently there than in Labūan, from which it is distant over four miles. Such Deer as Labūan once possessed have been pretty well exterminated. Gulls, Terns, and Waders are certainly not plentiful in these seas, and a new comer is struck by the absence of these graceful birds. At certain seasons Golden Plover, Snipe, and Painted Snipe make their appearance on the swampy low land near the sea. Shells are numerous and handsome; and a systematic course of dredging would produce some fine specimens. The Cones, Volutes, *Harpæ*, *Dolia* and *Cyprææ* are very fine; but those brought for sale are frequently injured by the natives in searching for them, or in making them more attractive to the purchaser.

"Natural history in Borneo owes a large debt to Mr. Low, one of the oldest residents in Labūan, whose name is well known to science. His labours in every department of zoology and botany, as well as his numerous excursions and travels in Borneo, and his intimate acquaintance with the various tribes of the great island, make him a foremost authority on all matters connected with their part of the Malay archipelago. To one of the several intelligent natives instructed in preparing birds I am indebted in great part for the present collection, which I trust will be found to contain the great majority of birds of 'Labūan and its dependencies.' I may add that I can vouch for the locality of *every* bird, as, with but one or two exceptions from trustworthy hands, they have all been shot by my Kadyan boy 'Būak' (who is retained in my house), or by myself, or by residents on the coast. At least fifty species have been obtained in the grounds of Government House, which is prettily situated in park-like land, dotted with forest, about one hundred and fifty acres in extent.

"The remaining birds in the collection, not specially included in the Labūan series, come from the opposite coast. Some are from the neighbourhood of Borneo, others from the little Kadhyan settlement of Lumbidan (whither I despatched my boy Būak for a month, after purchasing some birds from natives), on the north-west coast, and

about thirty miles above the mouth of the Brunei river. One or two may come from intermediate localities, such as the 'Lawas' and 'Kalias' rivers; they will all be carefully distinguished as to locality. My time is not sufficiently at my own disposal to permit me to record many of those valuable observations so useful to science; and I am conscious of many painful deficiencies, which can scarcely be excused even in a mere outdoor collector.

"I believe, however, that although many of the birds have been sent home from time to time by former collectors, the Labuan birds were not always distinguished from those from the mainland of Borneo—also that Hawks and Owls were not often obtained before by native collectors, who are generally dependent for their specimens on the *sumpitan* or blow-pipe, which is insufficient for large game.

"The Snipe, Plover, and Waders seem to arrive about August and to leave about the beginning of March, though I suspect that a few of them remain all the year, as I have seen them in April. The Asiatic Golden Plover on their first arrival have remains of their black summer dress; but they soon lose it; I observed none in that plumage after September. Curlew or Whimbrel appear to hang about all the year round.

"The Pigeons are numerous and of varied kinds; and on some of these I append a few notes; but I was unable through illness to carry the latter on beyond September."

Lastly, on the recommendation of my kind friend Dr. Selater, a large and important collection has been placed in my hands for description by Professor Rolleston. This collection was formed by Mr. W. H. Treacher, Acting-Governor of Labuan, and by him presented to the Oxford Museum. In the splendid series of birds sent by Mr. Treacher are many interesting additions to the avifauna of Borneo, some of the most striking of which, however, came from the mainland—that is to say, the province of Lumbidan. The collector has succeeded, however, in adding more than one species to the list of Labuan birds. Accompanying the catalogue of native names, which form a prominent feature in Mr. Treacher's collection, was a glossary, which I herewith transcribe. Too much reliance, perhaps, must not be placed on the names given by natives of any country, though it is only fair to add that those given by Mr. Treacher accord in nearly every instance with those furnished by Mr. Motley and Mr. Low; nor should I have made the above remark but for the fact that different names are sometimes given to the same bird when procured on the mainland and on Labuan itself.

The following is Mr. Treacher's glossary:—

Ayan .....	Fowl.
Anie.....	White Ant.
Api .....	Find.
Biru.....	Blue.
Burpalang .....	Particoloured.

Bulan .....	Moon.
Badan .....	Body.
Babat Mayat .....	To tie a corporal (Mayat) with strips of white cotton cloth, according to island custom.
Bras .....	Rice.
Bodoh .....	Foolish.
Darak .....	Blood.
Darat .....	Inland.
Etek .....	A Duck.
Hijan or yon .....	Green.
Hutau .....	Jungle.
Hujan .....	Rain.
Jambul .....	A crest.
Kuchik .....	Small; little.
Kuning .....	Yellow.
Karampok .....	A knife with a curved blade, which somewhat resembles the feathers of a Bulwer's Pheasant (Karampaki).
Kaug Kaug .....	To straddle; to open the legs.
Lahir .....	The neck.
Lalang .....	The common species of long grass.
Landack .....	A porcupine.
Merah .....	Red.
Malagoondi .....	The name of a tree.
Pulita .....	A lamp.
Pirang .....	Brown.
Panggit .....	Call.
Romba .....	Thick forest.
Sunat .....	To stray; to miss the way.
Sungai .....	River.
Siue .....	To whistle.
Tanah .....	Earth; ground.
Trop .....	To blow.
Umbun .....	Dew.

"The natives name many birds from a fancied interpretation of their notes, as 'whip-poor-will' with us, *e. g.* the 'Suip api' or 'Blow the fire' is supposed to call out Antit! Antit! Suip api! (blow the fire), Ambit prick! (take the pot), Jarang nasi! (cook the rice), Lapat anak! (the child is hungry)."

The nomenclature adopted in the present paper is principally that of Count Salvadori's 'Uccelli di Borneo,' whose pages have been consulted at every turn of its preparation.

## Order ACCIPITRES.

## Suborder FALCONES.

## Family FALCONIDÆ.

## Subfamily ACCIPITRINÆ.

1. *CIRCUS SPILONOTUS*, Kaup.

*Circus spilonotus*, Sharpe, Cat. B. i. p. 58; id. Ibis, 1877, p. 2.

A new species for Labuan, where Mr. Ussher obtained an immature male in September 1876 and a fine adult male in January 1877. This Harrier was first introduced to the notice of naturalists as a Bornean bird by Mr. Alfred Everett (*cf.* Sharpe, Ibis, 1876, p. 30). Governor Ussher has also sent it from Brunei, as will be seen by the list of birds published by me in the 'Ibis' for the present year. Mr. Treacher sent a pair of young birds from Labuan, but without indication of the native name beyond the word "Alang," which means "Hawk."

## Subfamily BUTEONINÆ.

2. *BUTASTUR INDICUS* (Gm.).

*Butastur indicus*, Sharpe, Cat. B. i. p. 297 (1874).

*Poliornis indica*, Salvad. *t. c.* p. 9.

Included in his work by Count Salvadori, with a query, no specimen having been sent from Borneo up to the time he wrote. Governor Ussher was therefore the first discoverer of the species in the Bornean avifauna. Five specimens were shot by him in different plumage in September and October 1876. Mr. Treacher also sends five specimens, and gives the native name as "Alang alap alap." Four of them are fine adult birds; and one is young; the latter, in addition to the mottled plumage and streaked breast, has five dark brown bands on the tail, much narrower than in the adult. One of Mr. Treacher's skins (the young bird) had the same native name "Alang juali" as the Peregrine Falcon, showing apparently that the natives have a different name for the young bird, or else that the collector mistook it for the young of the Peregrine.

## Subfamily AQUILINÆ.

3. *SPIZAËTUS LIMNAËTUS* (Horsf.).

*Spizaëtus limnaëtus*, Sharpe, *t. c.* p. 272; Salvad. *t. c.* p. 15.

"Not uncommon, but extremely shy and difficult of approach; it is a great foe to poultry, and also feeds on shell-fish" (*H. T. U.*).

Mr. Low sends a nestling, nearly full-grown, which is black all over, like the adult, of which three specimens are in Mr. Ussher's collection. This seems to show that I am wrong in considering the *S. caligatus* of Raffles to be the young of *S. limnaëtus*, as I have put forward in my 'Catalogue of Birds' (*l. c.*); but in Mr. Treacher's collection was a young bird in the striped plumage (similar to *S. cirratus*), with five bands on the middle and seven on the outer feathers. Although I at present keep only one species of *Spizaëtus*



as inhabiting Labuan, it is quite possible that further observers may recognize more. The species are very little understood, as may be gathered from the recent researches of Capt. Legge into the Ceylonese *Spizaëti* (cf. Legge, B. Ceylon, pp. 51, 55).

The young bird which Mr. Low forwarded was obtained from the egg, which he opened by cutting the shell in two halves and extracting the small occupant, who lived with him to a good size. He tells me that this Eagle builds on very high trees, and only lays one egg. Two nests which he observed had only one egg in each. That sent on the present occasion was taken in January 1875; it is white, with a few stains of ochraceous brown; axis 2·8, diam. 2·2.

#### 4. *HALIAËTUS LEUCOGASTER* (Gm.)

*Haliaëtus leucogaster*, Sharpe, Cat. B. i. p. 307.

*Cuncuma leucogaster*, Salvad. t. c. p. 5.

A young bird was in Governor Ussher's collection from Brunei; and he has since sent an adult bird shot by his boy Buak in Labuan. Mr. Treacher's collection also contained a fine adult bird, with the native name "Alang piak."

#### 5. *HALIASTUR INTERMEDIUS*, Gurney.

*Haliastur intermedius*, Sharpe, Cat. B. i. p. 314.

*H. indus*, Salvad. t. c. p. 12.

A young and an old bird from Governor Ussher, the latter shot on the Kina Banua river in April 1877. Mr. Treacher sends an old bird (No. 46) with the native name "Alang merah," and a young one (No. 27) simply marked "Alang" and apparently not recognized by the collector as the immature bird of the present species. Mr. Low sends an egg of this species taken from a nest in a lofty tree in December 1873; it is dull white; axis 1·95 inch, diam. 1·4.

### Subfamily FALCONINÆ.

#### 6. *FALCO PEREGRINUS*, Tunst.

*Falco communis*, Gm., Sharpe, Cat. B. i. p. 376; Salvad. t. c. p. 1.

A fine adult bird, of the true *F. peregrinus* type, procured by Mr. Treacher, according to whom it is called "Alang juali." The species has only been obtained before in Borneo by Motley at Banjermassing.

#### 7. *CERCHNEIS TINNUNCULUS* (L.).

*Cerchneis tinnunculus*, Sharpe, Cat. B. i. p. 425.

The only Kestrel yet recorded from Borneo is *Cerchneis moluccensis*, which is said to have been collected by Schwaner (cf. Salvad. Ucc. Born. p. 3). Governor Ussher procured a specimen, which, however, I believe to be the dark form of European Kestrel, known to ornithologists as *Cerchneis japonicus*. This opinion is confirmed by a second example of a Kestrel obtained by Mr. Treacher in Labuan, evidently of the same species as the one shot by Governor Ussher, and apparently a young male of *C. japonicus*, with the basal half of the tail commencing to get blue.

## Suborder PANDIONES.

## 8. PANDION LEUCOCEPHALUS, Gould.

*Pandion leucocephalus*, Sharpe, Cat. B. i. p. 451.

*Pandion haliaëtus* (L.), Salvad. t. c. p. 7.

An adult specimen (No. 44) sent by Mr. Treacher, who gives the native name as "Alang piak"—the same, it will be observed, as that applied to *Haliaëtus leucogaster*. The species was procured at Sarawak by Doria and Beccari, but has not been previously met with by the English collectors in N.W. Borneo.

## Suborder STRIGES.

## Family STRIGIDÆ.

## 9. KETUPA JAVANENSIS, Less.

*Ketupa javanensis*, Salvad. t. c. p. 20; Sharpe, Cat. B. ii. p. 8.

Two fine specimens, one dated December 1876, were sent by Governor Ussher. Mr. Treacher sends three adult birds, with the native name "Bugang."

## 10. PHODILUS BADIUS (Horsf.).

*Phodilus badius*, Motl. & Dillw. t. c. p. 8; Salvad. t. c. p. 22.

One specimen was sent by Mr. Low. It has already been recorded as a Labuan bird by Messrs. Motley and Dillwyn; indeed Mr. Motley speaks of it as being rarely seen, but not uncommon in the island. This appears somewhat strange when we consider the diligent efforts of Governor Ussher and Mr. Treacher to exhaust the avifauna of Labuan, and yet neither of them ever procured a specimen. It may, therefore, be migratory, and only plentiful at certain seasons of the year. Native name "Burong hantoo" (Motley).

## 11. NINOX SCUTULATA (Raffles).

*Ninox scutulata*, Sharpe, Cat. B. ii. p. 156.

*Ninox borneensis*, Bp., Salvad. t. c. p. 18; Sharpe, P. Z. S. 1875, p. 99.

Of this bird I have now examined a large series sent by Mr. Low, Governor Ussher, and Mr. Treacher, and I have very little to add to the remarks which I published in the 'Catalogue of Birds.' The characters which I there supposed might distinguish the Labuan bird as a race seem to me to be insufficient to warrant this conclusion. The uniform first primary appears to be a matter of age; and the number of caudal bars probably depends upon the same cause. In Mr. Treacher's series the majority of the specimens have five tail-bars, but one has only four. Native name "Pungok" (Treacher).

Two specimens from Labuan were in Mr. Low's collection; one of them a dark-coloured bird with four bands on the tail, and obsolete traces of fulvous bars on the inner web of the first primary. This belongs to the usual dark Labuan form of this *Ninox*; and it breeds in the island, Mr. Low having obtained two eggs with this identical specimen. The latter are very small for the size of the

bird, pure white, and measuring—length 0·95 inch, in diameter 0·8. The second specimen is much paler, and agrees best with the Sarawak bird described in my ‘Catalogue’ (p. 164); but it has five bars on the tail. These differences in coloration may be sexual, as the last named bird has a longer wing than the preceding one. Governor Ussher sent several specimens, which bear out the preceding remarks. He says it is tolerably common in Labuan.

## 12. *Ninox japonica* (T. & S.).

*Ninox japonicus*, Wald. Tr. Z. S. viii. p. 40.

Mr. Burbidge during his stay in Labuan procured a specimen of the large *Ninox* of China and Japan, which seems to migrate to the Malayan archipelago, where it has been called *Athene florensis* by Mr. Wallace. In the ‘Catalogue of Birds’ I have given a number of measurements showing that the Chinese bird is as a rule very much larger than the ordinary *Ninox scutulata*, and that from its wide-extending range it is apparently a migratory bird. Its wing is never less than eight inches, and often exceeds nine, the largest specimen hitherto examined by me having been Mr. Wallace’s type of *A. florensis*, which had the wing 9·1 inches in length. Mr. Burbidge’s specimen exceeds these dimensions, having a wing of 9·6 inches. In view, therefore, of the constantly larger size attained by these birds, I prefer to record the specimen under a different heading from *Ninox scutulata*, to draw attention more positively to the occurrence in Borneo of this larger species or race.

## Order PSITTACI.

### 13. *Palæornis longicauda* (Bodd.).

*Palæornis longicauda*, Salvad. t. c. p. 22.

*P. malaccensis*, Vig.; Motl. & Dillw. t. c. p. 26.

Native name “Beian” (*Treacher*).

Governor Ussher writes:—“About April this Perroquet appears to congregate in large numbers, especially the males, uttering loud cries. They then separate, probably for breeding-purposes. The males are extremely handsome and swift of flight.”

### 14. *Loriculus galgulus* (L.).

*Loriculus galgulus*, Salvad. t. c. p. 26.

*Psittaculus galgulus* (L.), Motl. & Dillw. t. c. p. 27.

A peculiarly coloured specimen from Labuan was in Mr. Low’s collection. It had the whole of the wing mottled with yellow, all the feathers being tipped with this colour. This is probably a variety, as the bird does not appear to be immature, having a distinct patch of bright blue on the crown and the red patch on the lower back well developed. Governor Ussher sends a pair, and adds, “It does not seem to thrive well in confinement.” It is also included in Mr. Treacher’s collection with the name “Peripas.” Mr. Low has forwarded three eggs of this small Parrot or “Love-bird.” They

are dull white, stained a good deal with brown. Two of them are rounded in shape, axis 0·7 inch, diam. 0·6–0·65; the third is a little more oval, measuring, axis 0·7, diam. 0·55.

a. *Harpactes duvauceli*, (Temmin.), Sharpe, P. Z. S. 1875, p. 102.

b. *Harpactes diardi* (Temmin.), Sharpe, t. c. p. 102.

To be expunged from the list of Labuan birds.

#### Family CAPITONIDÆ.

##### 15. MEGALÆMA VERSICOLOR (Raffl.).

*Megalæma versicolor*, Motl. & Dillw. t. c. p. 28.

*Chotorea versicolor*, Salvad. t. c. p. 33.

One specimen is mentioned as having been seen on the island by Mr. Motley; and Mr. Low sent an example which he told me had been shot on Labuan.

#### Order PICARIÆ.

##### Family PICIDÆ.

##### 16. XYLOLEPES VALIDUS (Temmin.).

*Xylolepes validus*, Salvad. t. c. p. 43.

In Governor Ussher's second collection.

##### 17. ALOPHONERPES PULVERULENTUS (Temmin.).

*Alphonerpes pulverulentus*, Salvad. t. c. p. 51.

One specimen, shot in January 1877 by Governor Ussher. Mr. Treacher also sends one specimen.

##### 18. THRIPONAX JAVENSIS (Horsf.).

*Thriponax javensis*, Salvad. t. c. p. 53.

*Hemilophus leucogaster* (Temmin.), Motl. & Dillw. p. 29.

In the collections of both Governor Ussher and Mr. Treacher. According to the latter it is called "Batatok turkubuk." The Governor says that it is "rather common, and is generally betrayed by the loud noise made by his powerful bill, when searching the trees for food."

##### 19. TIGA JAVANENSIS (Ljungh.).

*Tiga javanensis*, Salvad. t. c. p. 54.

"Not uncommon; habits similar to those of *Thriponax javensis*" (Ussher). Native name "Ouit souit" (Treacher).

An egg of this species is sent by Mr. Low. It is pure white, and measures—axis 0·95 inch, diam. 0·7.

##### 20. YUNGIPICUS FUSCO-ALBIDUS, Salvad. t. c. p. 42.

*Y. sondaicus* (Wall.), Sharpe, P. Z. S. 1875, p. 102.

Lord Tweeddale has shown (Ibis, 1877, p. 290) that the name *fusco-albidus* should be employed for this species. Governor Ussher

observes, "Commonly to be seen twisting and climbing up tree-stems." Native name, according to Mr. Treacher "Burong anie."

Mr. Low procured four eggs of this species. They are pure white, and vary a little in shape, two of them being a little more rounded than the two others: axis 0.65-0.75 inch, diam. 0.55-0.58.

c. *Callolophus puniceus*, (Horsf.), Sharpe, P. Z. S. 1875, p. 103.

d. *Callolophus malaccensis* (Lath.), Sharpe, t. c. p. 103.

e. *Graucopicooides rafflesi* (Vig.), Sharpe, t. c. p. 103.

f. *Meiglyptes tristis*, (Horsf.), Sharpe, t. c. p. 103.

g. *Meiglyptes tukki* (Less.), Sharpe, t. c. p. 103.

h. *Micropternus badius* (Temm.), Sharpe, t. c. p. 103.

i. *Sasia abnormis* (Temm.), Sharpe, t. c. p. 103.

All the above to be expunged from the Labuan list.

#### Family CUCULIDÆ.

##### 21. CUCULUS HIMALAYANUS, Vig.

*Cuculus himalayanus*, Jerd. B. Ind. i. p. 323.

Governor Ussher shot a specimen of this Cuckoo, which forms an interesting addition to the avifauna of Borneo, on the Kina Banua river at the latter end of March. The specimen has been examined by Mr. Seebohm, who has recently studied the genus; and he pronounces it to be undoubtedly of this species.

##### 22. HIEROCOCCYX STRENUUS (Gould).

*Cuculus strenuus*, Gould, B. Asia, pt. viii. (1856).

Mr. Treacher sends a specimen of an adult Cuckoo, which I have compared with the type in the British Museum, and which I believe to belong to the large Hawk Cuckoo described by Mr. Gould as *H. strenuus*, from the Philippine Islands. The question as to whether this species should be considered to be a distinct one, or whether it should be only reckoned a race of *H. sparverioides*, must be left to future observers who may have a larger series than I have had at their disposal.

The wing in Mr. Treacher's bird is 9.5 inches, measured in a straight line from carpal band to tip of longest primary; and the native name is given as "Wang kulit."

##### 23. CHRYSOCOCCYX XANTHORHYNCHUS (Horsf.).

*Chrysococcyx xanthorhynchus*, Salvad. t. c. p. 62.

Mr. Low's last collection contained two specimens, shot in Labuan on the 24th of June, 1875. He informed me that the species was very rare in the island, and was unknown to the natives. It is probably only an occasional visitant, as neither Governor Ussher or Mr. Treacher have procured specimens.

24. *SURNICULUS LUGUBRIS* (Horsf.).*Surniculus lugubris*, Salvad. *t. c.* p. 63.

Governor Ussher's collection contained a young and old bird shot in April 1877. The former was in very interesting plumage, being spotted with white all over the body.

25. *CACOMANTIS MERULINUS* (Scop.).*Cacomantis merulinus*, Salvad. *t. c.* p. 64.

Governor Ussher sends specimens with the following note:—"Rare in Labuan, appears about July and August. Habits and flight, as well as note, resemble those of the Golden Cuckoo of West Africa."

26. *EUDYNAMIS MALAYANA*, Cab. et Hein.*Eudynamis malayana*, Salvad. *t. c.* p. 68.*Eudynamis orientalis* (L.), Motl. & Dillw. *t. c.* p. 55.

A pair of birds, killed by Governor Ussher in September 1876. Mr. Treacher sends three specimens—one male, one female and a young bird in changing plumage. No native name is given.

27. *CENTROPUS JAVANENSIS* (Dum.).*Centropus javanensis*, Salvad. *t. c.* p. 76.

Sent by Mr. Low, Governor Ussher, and Mr. Treacher. The latter gives the native name as "Terakok."

Mr. Low forwarded an egg along with the old bird. The egg is white, without gloss, and measures—axis 1.25, diam. 0.95. There is not a great difference in size between the egg of this species and that of *C. eurycercus*.

28. *CENTROCOCYX EURYCERCUS* (Hay).*Centrococyx eurycercus*, Salvad. *t. c.* p. 78.*Centrococyx philippensis* (Horsf.), Motl. and Dillw. *t. c.* p. 54.

Both Governor Ussher and Mr. Treacher send a good series of this Lark-heeled Cuckoo, which is called "Bubut." Mr. Low obtained the eggs, which are dull white, and are rather rounded in shape; nevertheless they vary somewhat in form, the axis ranging from 1.05 to 1.25 inch, and the diameter from 0.95 to 1.05 inch. Mr. Low writes to me that these eggs were taken in Labuan in May 1873, the nest being loosely built near the ground in thick undergrowth. Governor Ussher states that the habits are similar to those of the Lark-heeled Cuckoos of Africa.

k. *Rhopodytes erythrognathus* (Hartl.), Sharpe, P. Z. S. 1875, p. 104.

l. *Rhinortha chlorophæa* (Raffl.), Sharpe, *t. c.* p. 104.

m. *Poliococcyx sumatranus* (Raffl.), Sharpe, *t. c.* p. 104.

To be expunged from the Labuan list.

## Family BUCEROTIDÆ.

## 29. ANTHRACOCEROS CONVEXUS (Temm.).

*Buceros convexus*, Motl. & Dillw. *t. c.* p. 53.*Hydrocissa convexa*, Salvad. *t. c.* p. 80.

Native name "Licap" (*Treacher*). "Shot in jungle near Government House. This bird is common, but very shy. It is found in Daat, Labuan, and Kurāman, and probably in Pappan" (*Ussher*). Mr. Low sends three eggs of this Hornbill; and he says that two is the number of the eggs laid, and that the female is shut up by the male in a tree; colour white, the texture rather coarse; axis 1.95–2.1 inches, diam. 1.25–1.4.

## Family UPUPIDÆ.

## 30. UPUPA EPOPS, L.

*Upupa epops*, Sharpe & Dresser, B. Eur. part vii. (1871).

Shot on Labuan by Mr. Treacher. His single specimen I have compared with Chinese and Central-Asian specimens; it can only be a rare visitant to Borneo, as it has never before been met with by any collector.

## Family MEROPIDÆ.

## 31. MEROPS SUMATRANUS (Raffl.).

*M. badius* (Gm.), Motl. & Dillw. *t. c.* p. 14.*M. bicolor*, Salvad. *t. c.* p. 90.

Governor Ussher writes:—"Common; seems to disappear about June or July, as none were noticed in August; very plentiful in April." Mr. Low sends the eggs; and according to his notes the birds nest in holes in sandy earth, laying five eggs; the latter are white and glossy, somewhat rounded: axis 0.95, diam. 0.85. The native name given by Mr. Low is "Burong tampakurow," but by Mr. Treacher it is rendered "Berkuru."

## Family ALCEDINIDÆ.

## 32. ALCEDO BENGALENSIS, Gm.

*Alcedo bengalensis*, Salvad. *t. c.* p. 92.

Adult and young birds in Governor Ussher's collection.

## 33. ALCEDO MENINTING, Horsf.

*Alcedo meninting*, Salvad. *t. c.* p. 93.

Rather common, according to Governor Ussher. Mr. Treacher also sends specimens, and gives the native name as "Mantes yan" or "biru." Along with the female bird Mr. Low sends four eggs, which are glossy white and rather rounded; axis 0.8 in., diam. 0.65.

## 34. PELARGOPSIS LEUCOCEPHALA (Gm.).

*Pelargopsis leucocephala*, Salvad. *t. c.* p. 95.

Of this large Kingfisher, already recorded by Motley as a Labuan

bird, Mr. Low sent an old female caught on the nest with two eggs : the latter are large and white, axis 1.5, diam. 1.25. The native name is "Bukaka," according to Mr. Treacher. Governor Ussher's note is as follows :—"Decidedly not common. I observed one at Tanjong Kubong, but could not get near it. One was given to me by Mr. Low, the others being shot by Būk."

### 35. *CEYX DILLWYNNI*.

*Ceyx dillwynni*, Sharpe, Monogr. Alced. pl. 43; Salvad. t. c. p. 99.

*C. tridactyla* (nec Linn.), Motl. & Dillw. t. c. p. 13.

*C. innominata*, Salvad. t. c. p. 97.

*C. sharpii*, Salvad. t. c. p. 98.

Native name "Mantis merah" (*Treacher*).

This species was described by me from Labuan in the year 1868. It has since been plentifully forwarded from that island, and from other parts of Borneo, and from Sarawak. Count Salvadori described a second species in 1869, which he called *Ceyx sharpii*; and again in the same paper he described the red Three-toed Kingfisher (*C. rufidorsa*, Strickl.) as *C. innominata*. This latter name was not adopted by me in my 'Monograph,' as an examination of the type showed that it was the true *Ceyx rufidorsa* of Strickland. Since the time when Mr. Low sent his first collections, the British Museum has carefully secured all the specimens which have been offered to it of these little rufous *Ceyces*, whose plumages are so difficult to understand : there is therefore a very fine series of *C. dillwynni* now in the national collection. Added to the large number of skins in different plumages now sent by Mr. Treacher, I can affirm that the supposition propounded by me in 1875, that *Ceyx sharpii* is only a stage of plumage of *C. dillwynni*, is now placed beyond all doubt as a fact. Dr. Brüggemann, in his paper on Dr. Fischer's collections from Central Borneo (Abhandl. Nat. Ver. Bremen, v. p. 532), has also given his attention to the species, with a similar result. At the same time the plumages of the species are not easy to follow when the specimens are unsexed, as is unfortunately the case with the entire series in the Museum and in Mr. Treacher's collection. Dr. Fischer believes that there is no difference in the sexes, when the birds are adult, beyond a little greater brilliancy of colouring on the part of the male.

There is no difficulty in believing this to be true, as far as I can see; and all the specimens with varying degrees of blue on the wing-coverts would be individuals in various stages of immaturity, while the red birds (*C. rufidorsa*), as far as Borneo is concerned, would be still more immature. I fancy that this determination of the progress to maturity is true of the female only; for I think it probable that the latter sex takes longer to effect her progress to the adult plumage than does the male; this is the case in other birds. That the males take less time to gain the full plumage is shown by four specimens in the Museum which have blackish bills (showing that they are young), and which yet have the colours of an adult male, excepting



that the blue on the coverts and scapulars is not so bright. It is obvious that the question can never be really settled till we have a number of carefully sexed and dated specimens; and meanwhile it may be remarked that great difficulties prevent the final acceptance of the explanation of the plumages above given; for if they are right the females must be in the proportion of at least three to one, judging from the collection now lying before me. Again, as to the fate of *C. rufidorsa* (of which there are several specimens in Mr. Treacher's collection agreeing exactly with another from Sumatra and another from Malacca), the perfect gradation, as far as the Bornean specimens are concerned, between *C. rufidorsa* and *C. dillwynni*, leaves no doubt of the identity of these two species; but then at present we have no evidence of the occurrence of *C. dillwynni* out of Borneo. *Ceyx rufidorsa* from Malacca and Sumatra may either be a plumage of *C. tridactyla* or *C. dillwynni*, or it may be a good and distinct bird. This seems to be hardly likely; and should it turn out that *C. dillwynni* is found in Malacca and that *C. rufidorsa* is really synonymous, then the former name must be suppressed.

Mr. Low procured three eggs of this species, along with a female bird in the plumage of *C. sharpii*, Salvad. As might be expected, these eggs are pure glossy white, axis 0.75, diam. 0.6.

### 36. HALCYON COROMANDA (Lath.).

*Halcyon coromanda*, Sharpe, Mongr. Alced. pl. 57.

*Halcyon lilacina*, Motl. & Dillw. t. c. p. 13.

*Callialcyon coromanda*, Salvad. t. c. p. 101.

Not very common, according to Governor Ussher. Mr. Treacher says it is also called "Bukaka," like the other kinds of Kingfishers.

Mr. Low sends five eggs of this Kingfisher taken in Labuan in May 1873: they are pure white, axis 1.2-1.25 inches, diam. 1.15-1.2. He also adds the following note:—"Burong Sakak, the large red or crimson Kingfisher. The nest is said to be pendulous and invariably to be accompanied in the same mass by a bee which is peculiarly vicious, so that the nest can only be robbed after destroying the bees; in the case of these eggs they set fire to the whole, unluckily." The nesting of this Kingfisher in a bee's nest seems to be a point of some interest.

### 37. HALCYON PILEATA (Bodd.).

*Halcyon pileata*, Sharpe, Mongr. Alced. pl. 62.

*Entomobia pileata*, Salvad. t. c. p. 102.

Governor Ussher writes:—"In September 1876 I saw this Kingfisher in the swamp on the plain, and was near enough to distinguish the colours, but could not get a shot. There can be no doubt as to the identity of the bird, as I have since obtained specimens. It seems to leave in March or April."

The native name given by Mr. Treacher and Mr. Low is "Bukaka." The latter gentleman sends five eggs of this species from Labuan; they are pure white and rounded, axis 1.2, diam. 1.0.

## 38. HALCYON CHLORIS (Bodd.).

*Halcyon chloris*, Motl. & Dillw. *t. c.* p. 13; Sharpe, Monogr. Alced. pl. 87.

*Sauropatis chloris*, Salvad. *t. c.* p. 103.

Sent by Governor Ussher and Mr. Treacher. According to the latter gentleman, the native name is "Burong mukichic." Mr. Low renders the native name as "Burong bukikick." He sends three eggs of this species, taken on the 22nd of March; they are pure white, axis 1.15-1.2 inch, diam. 0.95-1.0 inch. Governor Ussher writes:—"Extremely common everywhere, both close to habitations and in the forest. It is a very noisy bird, and appears to give warning to others of the approach of danger. It has not seldom prevented me from getting a shot at the white Pigeon on Enoc."

## 39. EURYSTOMUS ORIENTALIS (L.).

*Eurystomus orientalis*, Salvad. *t. c.* p. 105.

*Eurystomus pacificus*, Motl. & Dillw. *t. c.* p. 11 (nec Lath.).

Governor Ussher writes:—"Very common among the dead forest-trees, but keeps at a great height, hawking after insects, and is consequently not very easy to obtain. It reminds me in its motions of *Eurystomus afer* and *E. gularis* of West Africa, though its flight is much more lofty and not so quick as in *E. gularis*."

The native name is given by Mr. Treacher as "Lakei."

## Family CAPRIMULGIDÆ.

## 40. CAPRIMULGUS MACRURUS, Horsf.

*Caprimulgus macrurus*, Salvad. *t. c.* p. 117.

*Caprimulgus salvadorii*, Sharpe, P. Z. S. 1875, p. 99, pl. xx. fig. 1.

Native name "Kampa-kampa" (Treacher).

The distinguishing marks, principally consisting of the white edgings to the scapular feathers, which induced me to separate the Labuan bird as *Caprimulgus salvadorii*, seem to me, now that I have examined a large series, to be dependent on the age of the individual, and I feel compelled to suppress the species. I do this with great reluctance, as I had attached to it the name of Count Salvadori, with whose excellent work on the birds of Borneo commences quite a new era in the history of Malayan ornithology.

This Goatsucker is the common species in Labuan, and lays two eggs on the ground. The eggs sent by Mr. Low measure about 1.3 inch in length, diam. 0.9-0.95; they vary a good deal in shape and in markings, the ground-colour being creamy buff with faint purplish marblings and irregular lines; on some are seen overlying blotches and spots of brown. Governor Ussher says that it is "very common, pitching about the roads and pastures, making a loud and disagreeable noise at night, resembling the rapid strokes of a hammer on a hollow tree; it lays two eggs amongst dead leaves."

n. *Batrachostomus auritus* (Temm.), Sharpe, P. Z. S. 1875, p. 101.

o. *Batrachostomus javensis* (Horsf.), Sharpe, P. Z. S. 1875, p. 101.

To be expunged from the list of Labuan birds.

## Family CYPSELIDÆ.

## 41. CYPSELUS SUBFURCATUS, Blyth.

*Cypselus subfurcatus*, Salvad. t. c. p. 118.

Sent by Governor Ussher with a note:—"Occasional; resembles *C. affinis* of the Gold Coast, frequenting the edge of jungle." This Swift is new to Borneo, being only included in Count Salvadori's work as of probable occurrence in the island.

## 42. CYPSELUS INFUMATUS, Selater.

*Cypselus infumatus*, Salvad. t. c. p. 119.

A specimen, shot by Governor Ussher on the Kina Banua river, April 1877. It agrees with the type from Banjermassing in the British Museum.

Fig. 1.

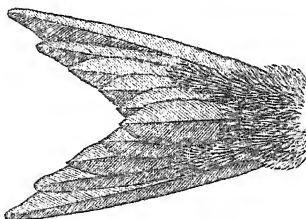
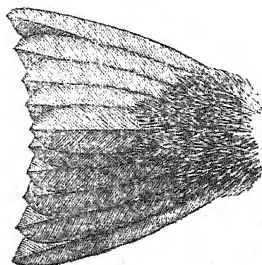
Tail of *Cypselus infumatus*.

Fig. 2.

Tail of *Cypselus lowi*.

## 43. CYPSELUS LOWI, sp. n.

*C. similis C. infumato, sed multo major, et corpore subtus cineras-*

*cente et cauda vix furcata distinguendus. Long tota 5, alæ 5·3, caudæ 2, tarsi 0·4.*

Governor Ussher writes:—"Not uncommon, but difficult to obtain owing to its lofty flight and rapid gyrations. It is generally found near large trees and forests; and although seen during the day-time, its favourite time for seeking its food seems to be towards sunset and in the twilight." (*H. T. U.*)

This is a very interesting species, and is a large form of *C. infumatus*, which, however, is easily distinguished by its smaller size (wing 4·6 inches). It is ashy grey underneath instead of ashy brown, and is recognizable at a glance by its tail being only slightly forked. (See figures 1, 2, p. 333.)

#### 44. DENDROCHELIDON LONGIPENNIS (Rafin.).

*Dendrochelidon longipennis*, Salvad. *t. c.* p. 122.

*Macropteryx klecho*, Motl. & Dillw. *t. c.* p. 9, pl. iii.

Native name "Layang-layang besar" (*Treacher*).

"Common, and in considerable numbers at times about Government House. Rapid and graceful in its motions; when wounded, it erects its crest and bites and strikes out at its captor. The chestnut-checked examples are rarer than the others." (*Ussher*).

#### 45. DENDROCHELIDON COMATA (Temm.).

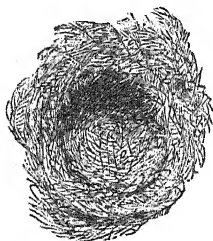
*Dendrochelidon comata*, Salvad. *t. c.* p. 123.

*Macropteryx comatus*, Motl. & Dillw. *t. c.* p. 10.

Specimens shot by Governor Ussher in May 1876.

Mr. Low sends a pair of birds with a little nest, about an inch and a quarter in diameter, in which are the remains of a broken white egg, concerning which he sends the following note:—"This bird was brought to me in February 1876 by a Kadhyau, who said he had

Fig. 3.



Nest of *Dendrochelidon comata*, nat. size.

killed it on a low tree or stump, on the south west-side of the island, with a sumpitan or blow-pipe. When he picked it up, he said that the nest which was with it was lying close to the bird with one broken egg in it, and he believed that the bird had been carrying it about with her. This was the first specimen of this pretty Swift I ever obtained; but I have since got three others."

Mr. Hume's notes on the breeding of the Indian Crested Swift (*Dendrochelidon coronata*) confirm the small size of the nest in these birds; and he states that the nest could be covered with half-a-crown. The Labuan collector doubtless brought down both bird, nest, and egg in one common overthrow; and the bird falling upon the nest gave him the idea that it had been carrying it about with her.

46. CHÆTURA CORACINA (Schl.).

*Chætura coracina*, Salvad. *t. c.* p. 124.

The Marquis Doria states that this species was very common in all the parts of Borneo visited by him. Governor Ussher, however, says that it is extremely rare in the island of Labuan, whence he only sends two specimens, which are identical with a Malayan bird.

47. CHÆTURA GIGANTEA, Temm.

*Chætura gigantea*, Legge, B. of Ceylon, p. 314.

*Hirundinapus giganteus* (Hasselt), Salvad. *t. c.* p. 124.

Governor Ussher procured this species, and sends a note on its capture:—"My first specimen of this Swift, which appears to be very rare, was brought to a friend in June 1876, at the other side of the island, whilst still alive. It had been, so its finder stated, picked up on the road, having fallen before his feet; it had probably been fighting. I observed one much resembling it near the lines, but out of shot. I have since obtained a second, in April 1877."

This is another species which Count Salvadori prognosticated might be a visitor to Borneo, and in which he has been borne out by the researches of the English naturalists.

Captain Legge compared the Labuan birds and others from Malacca with those procured by himself in Ceylon, and could find no specific difference between them.

## Order PASSERIFORMES.

### Family CORVIDÆ.

48. CORONE TENUIROSTRIS, Moore.

*Corone tenuirostris*, Moore, Cat. B. Mus. E.I. Co. ii. p. 558.

*Corvus enca*, pt., Sharpe, Cat. B. Brit. Mus. iii. p. 43.

Sent by Mr. Low. I have already stated (*anted*, p. 246), my belief in the distinctness of *C. tenuirostris* from *C. enca*.

49. CISSA MINOR, Cab.

*Cissa minor*, Sharpe, Cat. B. iii. p. 86.

One specimen sent by Mr. Treacher, but without any native name. Seeing that the species occurs for the first time in Labuan, it might be expected to be unknown to the natives. The bird sent agrees with the individuals of this race in the British Museum, and measures as follows: total length 12 inches, culmen 1.35, wing 5.2, tail 6, tarsus 1.6.

p. *Platylophus coronatus* (Raffl.), Sharpe, P. Z. S. 1875, p. 107.  
Must be expunged from the Labuan list.

#### Family DICRURIDÆ.

##### 50. DICRURUS ANNECTENS (Hodgs.).

*Dicrurus annectens*, Sharpe, Cat. B. iii. p. 231.

Shot by Governor Ussher in January 1877. Undistinguishable from Malaccan examples. The species has not been recorded from Borneo before, where, however, it cannot be very rare, as several specimens are sent by Governor Ussher, both from the mainland and from Labuan. Mr. Treacher also sends two specimens, but without any native name attached to them.

#### Family CAMPOPHAGIDÆ.

##### 51. PERICROCOTUS CINEREUS, Lafr.

*Pericrocotus cinereus*, Sharpe, Ibis, 1877, p. 19.

"November, 1876."

Several specimens of this interesting bird, which ranges as far as Borneo in its winter migration. It was first added to the Bornean avifauna by Mr. Everett, who procured it at Bintulu; it also occurred in Mr. Low's last collection from the north-west coast.

##### 52. LALAGE TERAT (Bodd.).

*Lalage terat*, Salvad. t. c. p. 145; Sharpe, Cat. B. iv. p. 95.

Several specimens of both sexes in Governor Ussher's collection, as well as in Mr. Treacher's. At present the species has not been met with by the English collectors on the mainland, though Beccari and Doria obtained it at Sarawak. Mr. Treacher gives the native names of the males as "Panak panggit bujan." Governor Ussher says it is common in the island.

The native name is given by Mr. Low as 'Burung suip api.' The latter gentleman sends two nests, which are small and of a shallow cup-shape: they are composed of dry bents interwoven with fragments of moss, spider's webs, and dead leaves. Each nest contains two eggs—the colour of those in the first being pale greenish white, thickly blotched and spotted all over with brown spots, amongst which are mingled here and there a few purplish markings and spots; axis 0·85, diam. 0·55. In the second nest the eggs are of a duller white, blotched and spotted as in those first described; axis 0·9, diam. 0·55.

#### Family MUSCICAPIDÆ.

##### 53. POLIOMYIAS LUTEOLA (Pall.).

*Poliomyias luteola*, Sharpe, Cat. B. iv. p. 201.

*Erythrosterina erythaca*, Salvad. t. c. p. 127 (nec Blyth).

A fully adult male in Mr. Treacher's collection. From its having no native name attached to it, the species is probably a rare visitant.

54. *XANTHOPYGIA CYANOMELÆNA* (Temm.).*Xanthopygia cyanomelæna*, Sharpe, Cat. B. Brit. Mus. iv. p. 251.*Cyanoptila cyanomelæna* (Temm.), Swinh. P. Z. S. 1871, p. 380.*C. cyanomelanura*, Blyth, Ibis, 1870, p. 164.

A series of this species was contained in Mr. Low's last collection; and Governor Ussher sent several specimens in different stages of plumage. This Flycatcher forms an addition to the Bornean avifauna.

55. *HYPOTHYMIS OCCIPITALIS* (Vig.).*Hypothymis occipitalis*, Sharpe, Cat. B. iv. p. 275.*H. azurea* (Bodd.), Salvad. t. c. p. 133.

Mr. Treacher sends three specimens. Native name "Burong umbun." This is also the name given by Mr. Low, who sends the eggs. The latter are creamy white, rather thickly clouded with bright rufous and with a few underlying spots of purple at the larger end. In one specimen, out of a nest of three, the spots are arranged in a ring round the thicker end. Governor Ussher says that the species is found in Labuan and Daat, but is not very common.

56. *RHIPIDURA JAVANICA* (Sparrm.).*Rhipidura javanica*, Sharpe, Cat. B. iv. p. 332.*Leucocerca javanica*, Salvad. t. c. p. 135.

A series sent by Governor Ussher and Mr. Low; Mr. Treacher also contributes adults of both sexes and a young, with the native name "Langi langi."

The eggs sent by Mr. Low are creamy buff in colour, with a ring of confluent spots about the larger circumference of the egg; the ground-colour of this zone is browner and darker than the rest of the egg, the spots being very distinct and of three colours, ochre, brown, and bluish-grey. In some of the eggs the spots are very distinct; but in the others they are less clearly marked. The ground-colour of the egg also varies, being in some specimens white, when the zone of spots is also paler. The nests (of which Mr. Low has sent two or three specimens) are small but deep cup-shaped structures, attached to the upperside of a small branch, on which they stand upright: they are composed of slender bents of grass, the outside thickly interwoven with cobwebs, so as to give an effect of concealment to the little structure. One nest is marked by Mr. Low as having been taken on the 23rd of March 1873.

57. *SIPHIA BANYUMAS* (Horsf.).*Siphia banyumas*, Sharpe, Cat. B. iv. p. 450.*Cyornis banyumas* (Horsf.), Salvad. t. c. p. 130.

According to Governor Ussher, this species is only occasionally seen in Labuan. The native name given by Mr. Treacher is "Panggit buyan."

q. *Philentoma pyrrhoptera* (Temm.), Sharpe, P. Z. S. 1875, p. 107.

Must be expunged from the Labuan list

## Family TURDIDÆ.

58. *Turdus pallens*, Pall.*Turdus pallens*, Salvad. *t. c.* p. 256.*Turdus modestus*, Eyton, Motl. and Dillw. *t. c.* p. 23.

Sent by Governor Ussher and Mr. Treacher; called, according to the latter, "Burong muncheat." Governor Ussher's two specimens were shot in December 1876.

59. *MONTICOLA SOLITARIUS* (P. L. S. Müll.).*Monticola solitarius*, Sharpe, *antea*, p. 249.

Governor Ussher shot a specimen, with the blue colour beginning to spread over the red breast, in February 1877. It was previously only known as a Bornean bird from the single bird shot by Mr. Everett at Bintulu in November 1875, and recorded by me as *Monticola pandoo* (Ibis, 1877, p. 13). A second specimen was procured on Kina Balu by Mr. Burbidge (*vide ante*, p. 249), who also possessed an example shot on Burong Island, close to Labuan.

60. *PHYLLOSCOPUS XANTHODRYAS* (Swinh.).*Phylloscopus xanthodryas*, Seebohm, Ibis, 1877, p. 71.

One specimen forwarded in Mr. Treacher's collection, and identified as the above by Mr. Seebohm. Native name "Suit mulagandie."

61. *LOCUSTELLA OCHOTENSIS* (Middend.).*Locustella ochotensis*, Seebohm, Ibis, 1879, p. 14.

In Mr. Low's last collection was a single specimen of this interesting bird; and my friend Mr. Seebohm tells me that it agrees with the types of Middendorff's species, which he saw not long ago in St. Petersburg. It is evident that Middendorff in his 'Sibirische Reise' figured only the young bird of *L. ochotensis*, and confused the species with the true *Locustella certhiola*.

62. *ACROCEPHALUS ORIENTALIS* (T. & S.).*Acrocephalus orientalis*, Salvad. *t. c.* p. 251.

Specimens were in Mr. Low's collection, which he assured me were from Labuan. Governor Ussher's and Mr. Treacher's birds of this species were from the mainland.

## Fam. TIMELIIDÆ.

## Subfam. BRACHYPODIINÆ.

63. *Irena crinigera*.*Irena criniger*, Sharpe, Cat. B. iii. p. 267.*I. cyanea* (Beggie), Salvad. *t. c.* p. 151.*I. puella*, Motl. & Dillw. *t. c.* p. 23.

Governor Ussher gives the following note:—"By no means rare; generally to be found on the small species of *Ficus*, devouring the



berries; extremely noiseless in its flight, and flitting into the thick bush when disturbed; is generally seen from April to September." In the large series which I have now examined from Borneo, I have found the characters on which I separated the species remarkably constant. Native name "Lalu" (*Treacher*).

64. *PYCNONOTUS ANALIS* (Horsf.).

*Pycnonotus analis*, Salvad. *t. c.* p. 197.

A series sent by Mr. Treacher, who gives the native name as "Parak berjambul." It was also a frequent bird in the collections of Mr. Low and Governor Ussher.

65. *PYCNONOTUS PLUMOSUS*, Blyth.

*Pycnonotus plumosus*, Salvad. *t. c.* p. 198.

Sent by Mr. Treacher; and Governor Ussher says that it is very common.

66. *BRACHYPODIUS MELANOCEPHALUS* (Gm.).

*Brachypodius melanocephalus*, Salvad. *t. c.* p. 201.

Sent by all three collectors. Native name "Piong" (*Treacher*). As Lord Tweeddale has already pointed out (*Ibis*, 1877, p. 307), my *B. immaculatus* (*Ibis*, 1876, p. 39) is not really to be separated as a species. I had not, at the time I described the bird, examined a sufficient number from Borneo.

67. *IORA SCAPULARIS*, Horsf.

*Iora scapularis*, Salvad. *t. c.* p. 190.

A specimen sent by Mr. Treacher. Native name "Parak-merapok. Governor Ussher states that this species is common, uttering a pretty little note, and being frequently found near dwellings. Mr. Low sends a single egg of this species, and it is a very beautiful one: axis 0.8, diam. 0.65. The ground-colour is white, obscured, however, by reddish spots, which are much more thickly distributed towards the larger end, where the ground-colour becomes almost invisible. These reddish dots and blotches are interspersed by a few spots of purplish grey, which are more apparent towards the thin end of the egg.

68. *IORA VIRIDISSIMA*, Bp.

*Iora viridissima*, Salvad. *t. c.* p. 192.

Only sent by Governor Ussher. He writes:—"This bird is very scarce. It is the only example I have procured. My specimen was shot by Büak near the Kina Banua river."

Subfam. TIMELIINÆ.

69. *CYANODERMA BICOLOR* (Blyth).

*Cyanoderma bicolor*, Sharpe, *Ibis*, 1876, p. 40.

*C. erythropteron* (Blyth), Salvad. *t. c.* p. 213.

Sent from Labuan by Governor Ussher and Mr. Treacher; according

to the latter gentleman it is called "Rungent." Governor Ussher says it is "occasional, and not common."

70. *MIXORNIS BORNEENSIS*, Bp.

*Mixornis borneensis*, Salvad. *t. c.* p. 215.

Appears to be rare, according to Governor Ussher, who has alone met with it.

71. *SETARIA AFFINIS* (Blyth).

*Setaria affinis*, Salvad. *t. c.* p. 231.

Only sent by Governor Ussher, who records it as "occasional."

72. *COPSYCHUS AMÆNUS* (Horsf.).

*Copsychus amœnus*, Salvad. *t. c.* p. 255.

"Very common everywhere; addicted to wooded situations; has a very sweet and full song, which, if it were more sustained, would be equal to that of a Nightingale or Thrush" (*Ussher*). Native name "Katajio" (*Treacher*). Mr. Low says that the nest of this Dial-bird is composed of "loose twigs in hollow palm-stems," and that five eggs are laid in a nest, one of which was procured by Mr. Low in January 1874. The same observer sends a series of eggs, which seem to be extremely variable, ranging from a pale greenish-white egg, mottled and blotched with brown, to an egg on which the dark brown blotches are so thickly distributed as almost to hide the greenish ground-colour of the egg altogether. Between these two extremes every possible intermediate colouring occurs; and the size also varies greatly, the axis ranging from 0·9–1·1 inch, and the diameter from 0·65–0·75 inch.

73. *CITTOCINCLA STRICKLANDI*.

*Copsychus stricklandi*, Motl. & Dillw. *t. c.* p. 20, pl. iv.

*Kittocinclla stricklandi*, Salvad. *t. c.* p. 253.

A series sent by Governor Ussher and Mr. Treacher. Native name "Pulita sungie" (*Treacher*). Governor Ussher says that it is rarer than the *Copsychus*, and is generally found in deep forest. Mr. Low had a specimen from the mainland of Borneo; and its occurrence there has been confirmed by Mr. Treacher's collections, which contained examples.

r. *Macronyx ptilosus*, J. & S., Sharpe, P. Z. S. 1875, p. 105.

s. *Brachypteryx malaccensis*, Hartl., Sharpe, *t. c.* p. 105.

t. *Timelia maculosa* (Temm.), Sharpe, *t. c.* p. 105.

u. *Phyllornis sonnerati* (J. & S.), Sharpe, *t. c.* p. 106.

v. *Phyllornis cyanopogon*, Temm., Sharpe, *t. c.* p. 106.

To be expunged from the Labuan list.

## Subfam. CISTICOLINÆ.

## 74. PRINIA SUPERCILIARIS.

*Prinia superciliaris*, Salvad. *t. c.* p. 249.

A series of specimens sent by Governor Ussher and Mr. Low, the latter of whom forwarded the eggs. The last-named gentleman informs me that the native name is "Burong anchariak," that it forms its nest amongst grass-stems near the ground, and is said to have a very pretty song. The majority of the eggs sent by him were glossy brick-red in colour, some of them being lighter, marbled with deeper red, while others are creamy chocolate; axis 0.65, diam. 0.5.

## 75. ORTHOTOMUS RUFICEPS, Less.

*Orthotomus ruficeps*, Salvad. *t. c.* p. 248; Sharpe, *Ibis*, 1877, p. 114.

An adult bird sent by Governor Ussher.

## 76. ORTHOTOMUS CINERACEUS, Blyth.

*Orthotomus cineraceus*, Sharpe, *t. c.* p. 114.

*Orthotomus sepium*, Motl. & Dillw. *t. c.* p. 19.

"Not uncommon; is generally found in very thick jungle and prefers tall trees. I have never noticed it except in copses and wooded situations." (*Ussher*.)

## Fam. LANIIDÆ.

## 77. LANIUS LUCIONENSIS, L.

*Lanius lucionensis*, Sharpe, *Ibis*, 1876, p. 43.

Several examples are sent by Governor Ussher from Labuan, as well as others from the opposite coast of Borneo. Mr. Treacher obtained an adult bird, and gives the native name as "Burong rangas."

78. HYLOTERPE GRISEOLA, Blyth, Salvad. *t. c.* p. 157.

Native name "Panggit hujan" (*Treacher*). Mr. Treacher sends one specimen; and the species was also in Governor Ussher's collection, but is believed to be rather rare by the last-named gentleman.

## Family NECTARINIIDÆ.

## 79. CINNYRIS PECTORALIS (Horsf.).

*Cinnyris pectoralis*, Shelley, *Monogr. Cinnyridæ*, part. vi.

*Nectarinia pectoralis*, Motl. & Dillw. *t. c.* p. 15.

*Cyrtostomus pectoralis*, Salvad. *t. c.* p. 170.

Sent by Mr. Low, and also by Governor Ussher and Mr. Treacher, in some numbers. According to the latter observer, the native name is "Suit kuchik."

The large series of eggs which Mr. Low has procured shows immense variation in colours. There seem to be at least three types of coloration in the egg: the first has the ground-colour bluish, with

purple spots and blotches generally at the thicker end; this is the rarest type. The second has a greyish-blue ground almost entirely obscured with brown spots and blotches, with a few distinctly indicated spots of darker brown here and there; while the general aspect of the third type of coloration is brown, everywhere clouded with mottlings of darker brown and greenish brown. Between these different forms, however, there is every intervening link.

80. *CINNYRIS HASSELTII* (Temm.).

*Cinnyris hasselti*, Shelley, Monogr. Cinnyr. part iv.

*Nectarophila hasselti*, Salvad. t. c. p. 177.

Governor Ussher states that this species is very common at "Coal Point." Mr. Low sends an egg along with the old male and female bird. The egg is a peculiarly coloured one, being creamy white, with longitudinal streaks of light reddish brown or purplish grey extending nearly the whole length of the egg, and sometimes confluent so as to hide the ground-colour; axis 0.7 in., diam. 0.55 in.

81. *CALCOSTETHA INSIGNIS* (Jard.).

*Calcostetha insignis*, Shelley, Monogr. Cinnyridæ, part iv.; Salvad. t. c. p. 177.

A pair sent by Mr. Treacher with the native name "Suit tonjong." The species also occurred in the collections of Mr. Low and Governor Ussher.

82. *ÆTHOPYGA SIPARAJA* (Raffl.).

*Æthopyga siparaja*, Shelley, Monogr. Cinnyr. part ix.

*A. eupogon*, Salvad. t. c. p. 174.

Two sets, consisting of two and of six eggs respectively, are sent by Mr. Low. These are most beautiful, the ground-colour being of a pinky flesh-colour, deepening into richer rufous at the obtuse end, and sparingly spotted and scrawled with dark brown. The two eggs sent by themselves are more uniformly blotched with reddish, the spots being more sparingly distributed; axis 0.55 in., diam. 0.45. Governor Ussher says that this Sunbird is common in Labuan.

83. *ANTHREPTES MALACCENSIS* (Scop.).

*Anthreptes malaccensis*, Salvad. t. c. p. 178; Shelley, Monogr. Cinnyridæ, part vi.

*Nectarinia javanica*, Motl. & Dillw. t. c. p. 17.

A series sent by Governor Ussher and Mr. Treacher. The males have bright yellow breasts. Native name "Suit besar" (Treacher). Mr. Low sends several nests, and says that two eggs only are laid in each nest. The eggs are very variable, the general type being like that of a Bunting, dull white or purplish grey, spotted and scribbled all over with blackish pencillings. On some of the paler-coloured eggs these lines and dots are bolder and more distinct.

84. *ANTHREPTES PHŒNICOTIS* (Temm.).*Anthreptes phœnicotis*, Shelley, Monogr. Cinn. part. vii.*Chalcoparia cingalensis* (Gm.), Salvad. t. c. p. 180.*Nectarinia cingalensis*, Motl. & Dillw. t. c. p. 16.

Sent by Governor Ussher.

w. *Arachnothera chrysogenys* (Temm.), Sharpe, P. Z. S. 1875, p. 107.

To be expunged from the Labuan list.

## Family DICEIDÆ.

85. *PRIONOCHILUS EVERETTI*, Sharpe, Ibis, 1877, p. 16. (Plate XXX. fig. 1.)

The single specimen sent by Governor Ussher agrees thoroughly with the type; and there is no doubt of the distinctness of this bird from *Prionochilus obsoletus*, of which a figure is also now given (Plate XXX. fig. 2).

86. *DICÆUM TRIGONOSTIGMA* (Scop.).*Dicæum trigonostigma*, Salvad. t. c. p. 166.*Dicæum croceorenter*, Motl. & Dillw. t. c. p. 17.

This bird is also recorded as common in Labuan by Governor Ussher. Mr. Low gives the native name as "Suit binalu," and sends a nest of the species with one egg. The latter is bluish white, with tiny brown specks distributed over its surface, with a few larger spots of darker brown, principally at the large end, but also somewhat scattered over the rest of the egg; axis 0.65, diam. 0.45. Mr. Treacher also sent a series of specimens, and gave the same native name as Mr. Low.

87. *DICÆUM NIGRIMENTUM*, Salvad. t. c. p. 165.*Dicæum coccineum*, Motl. & Dillw. t. c. p. 19.

This species seems to be distinct from *D. coccineum*. It is said to be common in Labuan by Governor Ussher.

## Family MOTACILLIDÆ.

88. *BUDYTES VIRIDIS* (Gm.).*Budytes viridis*, Salvad. t. c. p. 260.*Motacilla cinereocapilla*, Motl. & Dillw. t. c. p. 21.Native name "Bras bras" (*Treacher*).89. *MOTACILLA MELANOPE*, Pall.*Motacilla melanope*, Dresser, B. Eur. pt. xli.*M. bistrigata*, Salvad. t. c. p. 259.

"Very scarce," according to Governor Ussher.

The rarity of this species depends doubtless upon its being a migrant in Borneo; but it cannot be a common visitor, as Doria only obtained one example, and it has not been sent by Mr. Low in any

of the collections I have examined, nor did it occur in Mr. Treacher's boxes.

90. *ANTHUS GUSTAVI*, Swinhoe.

Mr. Treacher gives the name as "Bras bras katan."

Family FRINGILLIDÆ.

91. *PADDA ORYZIVORA* (L.).

*Padda oryzivora*, Salvad. t. c. p. 263.

Governor Ussher observes:—"This bird was introduced to the island by Mr. Low; it has thriven, and is now in prodigious numbers."

92. *MUNIA ATRICAPILLA* (V.).

*Munia atricapilla*, Salvad. t. c. p. 265.

*Amadina sinensis*, Motl. & Dillw. t. c. p. 25, pl. vi.

Several specimens sent by all three collectors. This species was introduced by Mr. Low, who forwards a number of eggs, which are dull white like those of the following species, from which they are not to be distinguished.

93. *MUNIA FUSCANS* (Cass.).

*Munia fuscans*, Salvad. t. c. p. 268.

Along with the eggs of this little Finch, Mr. Low sends a pair of the birds, which he calls the "Black Sparrow." He says:—"This bird, formerly the only one of the Sparrows in Labuan, is now rapidly disappearing before the Black-headed Brown Sparrow (*Munia atricapilla*) and the Java Sparrow, both introduced birds." The eggs are dull, lustreless, white; axis 0.6, diam. 0.45.

Family HIRUNDINIDÆ.

94. *HIRUNDO GUTTURALIS*, Scop.

*Hirundo gutturalis*, Salvad. t. c. p. 125.

Native name "Layang layang kuckie." This species is represented by a single adult specimen in Mr. Treacher's collection; and the native name is given on his authority. From the fact of its having the same vernacular title as the common Swallow of Labuan, *H. javanica*, it is evident that the natives do not recognize the difference between the two species; yet the latter is doubtless the resident Swallow, while the present species will prove in all probability to be only a passing migrant. This is the same bird which I called *Hirundo rustica*, L., in my paper on Dr. Steere's Philippine collection (Tr. Linn. Soc. new series, i. p. 328). It is, as Count Salvadori remarks, very doubtfully distinct from the Common Swallow of Europe, but is apparently smaller, and I have never seen an adult male with the rufous breast of *H. rustica*. This is the first time that I have seen the species in any collection from N.W. Borneo; but Dr. Beccari procured it in Sarawak.

95. *HIRUNDO JAVANICA*, Sparmm.*Hirundo javanica*, Salvad. *t. c.* p. 126.*H. pacifica*, Motl. & Dillw. *t. c.* p. 10.

Governor Ussher sends the following note:—"Is seen everywhere; affects the sea-shore, and even the open sea at times; builds about houses, but also in old trees; frequently perches on old stumps on the sea-beach; and is fond of swampy localities towards evening, when it flies very low." According to Mr. Treacher, the native name is "Layang layang kuckie."

Mr. Low sends a quantity of eggs taken in May 1873 in Labuan. He says that it also breeds in fissures of rocks. The eggs are white, covered with small reddish-brown and purple spots, chiefly near the thicker end; one of the eggs is very thickly clouded near the obtuse end with reddish and purple; axis 0·7-0·75, diam. 0·5-0·55. Some of the eggs are much less thickly spotted than others, the spots being quite tiny in many of them; in most the reddish shade predominates; but in a few the dots are nearly all pale purple, with some tiny specks of red.

## Family ARTAMIDÆ.

96. *ARTAMUS LEUCORHYNUS* (L.).*Artamus leucorhynus*, Salvad. *t. c.* p. 140.*A. leucogaster* (Valenc.), Sharpe in Rowley's Orn. Misc. iii. p. 179.

Governor Ussher writes:—"Very common: frequently to be observed in considerable numbers towards evening, especially after rain, hawking after the insects rising from the damp earth, in company with Rollers and Swifts." Native name "Alap alap" (*Treacher*). Four eggs of this species are sent by Mr. Low, along with the skin of the old bird. They are creamy-white in colour, with spots of pale brown congregated towards the large end of the egg; there are a few spots and blotches of light purplish grey underlying the brown, and generally collected at the thicker end; the amount of spotting varies on each egg; axis 0·95, diam. 0·7.

x. *Cymbirhynchus macrorhynchus* (Gm.), Sharpe, P. Z. S. 1875, p. 107.

y. *Eurylæmus ochromelas*, Raffl., Sharpe, *t. c.* p. 107.

Both the above-named species must be expunged from the Labuan

## Family STURNIDÆ.

97. *CALORNIS CHALYBEUS* (Horsf.).*Calornis chalybeus*, Salvad. *t. c.* p. 271.*Calornis panayensis*, Motl. & Dillw. *t. c.* p. 24.

Native name "Langkir" (*Treacher*). Governor Ussher's note is as follows:—"Perhaps the commonest bird in Labuan at this season (August, September, and October); and previous to May they roost in countless thousands in the trees near Government House. They

are very noisy, and are fond of associating with the Pigeons in the dove-cot, where I believe they also breed. They will nest occasionally under the eaves of houses; and one pair built its nest and reared its young this year in the verandah in a blind or screen which is kept rolled up, forming a hollow inside."

Two sets of eggs were procured by Mr. Low with the old birds. The first contained only a single egg, the latter being long in shape, of a light greenish blue, sparsely spotted with faint underlying spots of brown and larger spots and blotches of red, principally distributed at the obtuse end; axis 1.15, diam. 0.7. The second set consisted of three eggs not so elongated as the first, and somewhat more plentifully spotted with red as regards two out of the three; axis 1.05, diam. 0.75. The eggs were obtained in June 1873.

#### 98. GRACULA JAVANENSIS (Osb.).

*Gracula javanensis*, Motl. & Dillw. t. c. p. 25; Salvad. t. c. p. 274.

According to Mr. Low, this bird is called by the natives "Burong tiong;" and the eggs are said to be very difficult to get. The two sent by him are pure white, and are large for the size of the bird; axis 1.3, diam. 1.15; they were obtained in May 1874.

### Family PITTIDÆ.

#### 99. PITTA MUELLERI (Bp.).

*Pitta muelleri*, Salvad. t. c. p. 240.

Sent by all three naturalists. Native name "Teong tanah," according to Mr. Treacher. Five eggs are sent by Mr. Low, along with the old female. Their ground-colour is creamy-white, rather thickly scribbled over with reddish-brown lines and spots, and plentifully varied with underlying spots of light purple; axis 0.95-1.0 in., diam. 0.8 in.

### Order COLUMBÆ.

#### 100. CHALCOPHAPS INDICA (L.).

*Chalcophaps indica*, Salvad. t. c. p. 299.

One specimen sent by Governor Ussher, with a note:—"♀ Dove: Labuan. Five of these were brought to me alive; but one night a cat got at them, and only left this female. The males were lavender-coloured, grey about the head and neck."

To Mr. Burbidge I am indebted for the following interesting notes and sketches:—

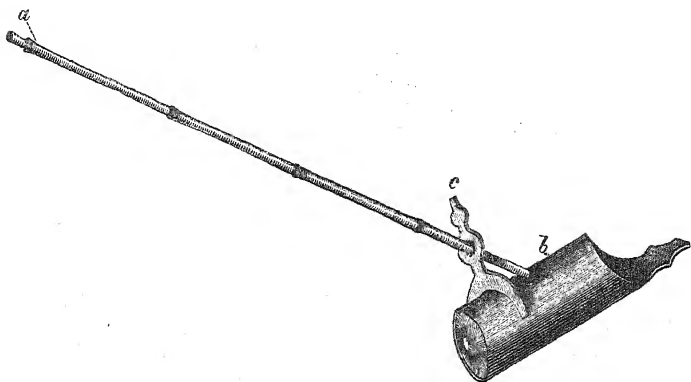
"Herewith I send you sketches and a short account of the 'call-wigwams' used by the Kadyans (a pastoral race who live in N.W. Borneo) in order to capture the small green 'Puni' Pigeon.

"The call is formed of two pieces of bamboo (*a*), a slender tube (*b*), a short piece 3"-4" in diameter, and a connecting piece of wood (*c*).



At *b* is a hole similar to the embouchure of a flute; and the lower end of the blow-tube, *a*, is fitted to this in such a manner that, on blowing at *a*, a soft, low, flute-like 'cooing' is easily producible; and this can be readily modulated so as to be heard either at a long distance or near at hand. The native, who has taken up his position in the forest or jungle where these little birds are found, blows very softly at first; but if there be no answering call from the birds he blows louder and louder, thus increasing the radius of sound. If there really be any Pigeons of this kind within hearing, they are sure to answer; and then the hunter blows softer and softer until they are enticed into the 'wigwam' of leafy branches which he has erected in order to conceal himself from sight. The door or entrance to

Fig. 4.



'Dakut' or call used by the Khadyan natives.

these 'wigwams' is partially closed by a screen of palm (*Nipa fruticans*) leaves. This is elevated a little (as shown in my sketch) to allow the Pigeons to enter, after which it is allowed to fall, portcullis-like, entirely, so as to close the entrance; and the bird is then easily secured. Above the entrance two holes are made, so that the hunter can look out without being seen. These huts are formed of a few poles or sticks, rudely thatched with twigs and palm-leaves, and vary from four to six feet in height.

"This Pigeon is migratory, and arrives in Labuan and on the opposite Bornean coast with the change of the monsoon, about April. Many hundreds are then caught by means of this 'dakut,' or 'bamboo call,' and are offered for sale by their captors for a cent or two each. They are also kept by the natives as domestic pets, along with young Hornbills, the 'Mina' bird or 'Grackle,' a small species of Parrakeet, and Java Sparrows."

101. *TRERON VERNANS* (L.).

*Treron vernans*, Motl. & Dillw. *t. c.* p. 30; Salvad. *t. c.* p. 286.

"Plentiful everywhere; feeds on fruits and berries" (*Ussher*).  
Native name "Punie kurackow" (*Treacher*).

102. *TRERON OLAX* (Temm.).

*Treron olax*, Salvad. *t. c.* p. 289.

Governor Ussher writes:—"Not so common as *T. vernans*, but occasionally to be met with. It is of similar habits, but more retiring than the above-mentioned bird." Native name "Punie suit" (*Treacher*).

103. *CALÆNAS NICOBARICA*.

*Calœnas nicobarica*, Sharpe, P. Z. S. 1875, p. 110.

Governor Ussher observes, in a letter dated August 5th, 1877, "Būk has succeeded in establishing two additional birds for Labuan. One is the grey-and-white Eagle (*H. leucogaster*); and the other is the beautiful green-backed Pigeon (*Calœnas nicobarica*), two fine specimens of which he got on Pappan Island, a mile from the harbour. Low had two in confinement, but could tell nothing of them. Rajah Brooke had one alive in Sarawak. Two I saw from Saigon; and I sent you one from Brunei; and now it is established in the Labuan list. I was sure that I had seen it in Enoe and Burong Islands; now it is a certainty." Since the Governor's return to England, Mr. Treacher has procured this bird on the island of Labuan itself, where I had heard of its occurrence also from Mr. Burbidge. The native name, according to Mr. Treacher, is "Jan junli."

104. *PTILOPUS JAMBU* (Gm.).

*Ptilopus jambu*, Salvad. *t. c.* p. 289; Elliot, P. Z. S. 1878, p. 554.

Governor Ussher sends a specimen of a male. "This lovely Pigeon was shot in August of this year, 1876, near the Kina Banua river, towards the southern end of the island; have not observed it before, nor noticed it in Mr. Low's collections. I know nothing of its habits, and did not observe it before August."

105. *CARPOPHAGA ÆNEA* (L.).

*Carpophaga ænea*, Salvad. *t. c.* p. 290.

"Common in Labuan and its islands, but shy and difficult of approach. At certain seasons it feeds voraciously on the fruit of the many varieties of the *Ficus indicus* in these parts, and swallows the fruit whole: the latter is about as large as a sloe-berry; and I have found their crops full of them." (*Ussher*.) Mr. Low sends a single egg, which is pure white; axis 1·7 in., diam. 1·25 in.

106. *CARPOPHAGA BICOLOR* (Scop.).

*Carpophaga bicolor*, Salvad. *t. c.* p. 292.

*Carpophaga luctuosa*, Motl. & Dillw. *t. c.* p. 31.

Governor Ussher observes:—"This lovely bird (the beauty of

which in life is faintly represented by the skinned specimens) has only been seen by me on the island of Enoe, about two miles and a half from Victoria, although a friend of mine appears to have seen it on the island of Daat, and it is said to occur in Labuan itself. It is generally in company with another Pigeon, and at times I have seen a dozen or twenty together, at others scarce one. The island of Enoe itself cannot exceed three acres in extent; but I have seen several kinds of Pigeons on its lofty trees. The feathers of this Pigeon, when freshly shot, have at their root a deep buff or golden tinge, which fades, like the pink shade on the breast of some Terns, after death. It feeds on fruits and berries." (*H. T. U.*)

Mr. Low's collection contained the egg of this Pigeon: it is large, pure white, axis 1.9 in., diam. 1.4 in. The native name is given by him as "Burong rawa." Mr. Treacher gives it as "Peagam rawa."

#### 107. *SPILOPELIA TIGRINA* (Temm.).

*Spilopelia tigrina*, Salvad. *t. c.* p. 296.

Governor Ussher observes:—"This pretty bird, now plentiful in Labuan, was introduced to the Bornean coast a few years since by Mr. Low. It has thriven prodigiously, as it is rarely molested, except by the youngsters from the men-of-war who call here occasionally. It is always to be found about paths and by the road-side."

The eggs sent by Mr. Low are pure white; axis 1.05-1.15 in., diam. 0.8-0.85. They were taken in January 1873; and he gives the native name as "Burong terkukur."

#### Family MEGAPODIIDÆ.

#### 108. *MEGAPODIUS CUMINGI*, Dillw.

*Megapodius cumingi*, Motl. & Dillw. *t. c.* p. 32; Salvad. *t. c.* p. 302.

*Megapodius lowii*, Sharpe, *P. Z. S.* 1875, p. 111.

Native name "Menambrun" (*Treacher*). Mr. Ussher sends the following note:—"Not uncommon. I have seen its nests on Kuraman, but they are to be seen also on Labuan and Daat. The mounds appear to be about four or five feet in height and about twelve feet in circumference, composed of earth and rubbish. The iris in the living bird is brown; the skin about the eye and cheeks pink or roseate."

The late Marquis of Tweeddale, in his paper on Mr. Everett's Cebu collections (*P. Z. S.* 1877, p. 766), has referred to my naming the Labuan Megapode after Mr. Low, and has pointed out an evident error which I made in describing it as new. I was misled by the opening sentence of Mr. Dillwyn's treatise (p. 32):—"Some specimens of these birds are in the British Museum, to which they were presented by Mr. Cuming, having been collected by that gentleman in the Philippine Islands; in Labuan they are not uncommon," &c.; as well as by his naming the species after Mr. Cuming. He writes, however, to Lord Tweeddale that the bird he really described came from Labuan, so there is an end of the question. The measurements also bear out the correctness of his statement.

## Family PERDICIDÆ.

## 109. EXCALFACTORIA CHINENSIS (L.).

*Excalfactoria chinensis*, Salvad. *t. c.* p. 311.

Sent by Governor Ussher and Mr. Low. The former writes:—"Tolerably plentiful in open spaces in short thick grass: is met with up to May or beginning of June in little beeries; after that I observed them in pairs. They are of rapid flight, and are hard to flush a second time."

Mr. Low sends a number of eggs of this species. They vary from dark olive-brown with few black dots, to pale olive-brown where the black dots are more numerous. The eggs were taken by Mr. Low in January 1873. Native name "Burong puyu puyu." Axis 1.0 in., diam. 0.75 in.

## Order GRALLÆ.

## Family CHARADRIIDÆ.

## 110. CHARADRIUS FULVUS (Gm.).

*Charadrius fulvus*, Salvad. *t. c.* p. 312.

*Charadrius virginicus*, Motl. & Dillw. *t. c.* p. 57.

Native name "Pimping" (*Treacher*). Governor Ussher's specimens were obtained in October 1876.

## 111. ÆGIALITIS PERONII (Temm.).

*Ægialitis peronii*, Salvad. *t. c.* p. 315.

*Charadrius alexandrinus*, Motl. & Dillw. *t. c.* p. 57.

Governor Ussher writes:—"Not uncommon, but rather solitary. Generally seen alone on the beach, but sometimes in couples." Mr. Treacher sends several specimen with the usual name, "Pimping," which seems to be applied to all the small Waders.

The eggs of this little Plover were contained in Mr. Low's collection. They were two in number; axis 1.25-1.3 in., diam. 0.85 in. The colour is creamy buff, thickly scribbled over and blotched with blackish brown or black, more especially at the larger end; there are also numerous scribblings of pale purplish grey underlying the black markings.

## 112. ÆGIALITIS GEOFFROYI (Wagl.).

*Ægialitis geoffroyi*, Harting, *Ibis*, 1870, p. 378, pl. xi.; Salvad. *t. c.* p. 318.

Forwarded by Governor Ussher, with the note that it is occasionally seen on sand-spits and rocks in small flocks. First noticed in July.

## 113. ÆGIALITIS DUBIA (Scop.).

*Ægialitis dubia*, Salvad. Ucc. Born. p. 316.

Mr. Treacher procured a specimen of the Little Ringed Plover, which has been already recorded from Borneo; and Mr. Alfred Everett obtained it at Sibu; but it has not been met with in Labuan before.

## Family GLAREOLIDÆ.

## 114. GLAREOLA ORIENTALIS, Leach.

*Glareola orientalis*, Salvad. *t. c.* p. 319.

An adult bird, in Governor Ussher's collection, killed December 1876. The native name, "Tara-tara," is given by Mr. Treacher, who also sends an adult bird.

## Family HÆMATOPODIDÆ.

## 115. STREPSILAS INTERPRES (L.).

*Strepsilas interpres*, Salvad. *t. c.* p. 320.

Some young birds sent by Governor Ussher, who killed them in September 1876.

## Family SCOLOPACIDÆ.

## 116. TRINGOIDES HYPOLEUCUS (L.).

*Tringoides hypoleucus*, Motl. & Dillw. *t. c.* p. 60; Salvad. *t. c.* p. 326.

Adult and young specimens sent by all three collectors. Native name "Pimping" (*Treacher*).

## 117. TOTANUS GLAREOLA (L.).

*Totanus glareola*, Salvad. *t. c.* p. 327.

Sent by Governor Ussher.

## 118. TOTANUS CALIDRIS (Gm.).

*Totanus calidris*, Salvad. *t. c.* p. 328.

Two specimens, in Governor Ussher's collection.

## 119. TOTANUS INCANUS (Gm.).

*Actitis incanus*, Finsch & Hartl. Faun. Centralpolyn. p. 182.

A single specimen, shot by Governor Ussher in December 1876.

## 120. NUMENIUS UROPYGIALIS, Gould.

*Numenius phaeopus*, Salvad. *t. c.* p. 333.

Governor Ussher writes:—"Not very common, as a rule, about Labuan. I obtained three out of a flock at the mouth of the Kina Banua river about four miles from Victoria, but by a chance shot at about sixty yards. In the 'Plover season' they will associate with the latter, and are then more numerous."

## 121. GALLINAGO STENURA (Kuhl).

*Gallinago stenura*, Salvad. *t. c.* p. 334.

Native name "Pimping" according to Mr. Treacher.

## 122. GALLINAGO STENURA (Horsf.).

*Gallinago stenura*, Salvad. *t. c.* p. 334.

Shot by Governor Ussher in September 1876.

## Family RALLIDÆ.

123. *HYPOTÆNIDIA STRIATA* (L.).*Hypotænidia striata*, Salvad. *t. c.* p. 336.

Sent by all three collectors. Mr. Low has also procured the eggs, of which he has sent a series; the native name is "Burong patikan," according to him. The eggs are creamy-buff, with reddish dots and blotches and underlying paler spots of purplish grey; the style of marking is irregular, as sometimes the reddish and purple spots are found evenly over the surface of the egg, while in others the paler purplish spots predominate, and the reddish marks are distributed over the thicker end of the egg. Axis 1·3–1·4, diam. 1·0–1·1 in.

124. *RALLINA FASCIATA* (Raffl.).*Rallina fasciata*, Salvad. *t. c.* p. 337.

In Governor Ussher's collection, as well as Mr. Treacher's; according to the latter gentleman the native name is "Patikan."

125. *ERYTHRA PHÆNICURA* (Penn.).*Erythra phænicura*, Salvad. *t. c.* p. 340.*Gallinura phænicura*, Motl. & Dillw. *t. c.* p. 60.

Native name "Karuak" (*Treacher*). "Common in swampy places, where it rises a first time, but it is difficult to flush again" (*Ussher*).

Several eggs are in Mr. Low's collection. They are of the usual Water-hen type, buff with reddish brown spots and small blotches distributed over the greater part of the egg, interspersed with dull purplish grey underlying spots. Two specimens are remarkable for the minuteness of the spots, which are principally collected at the larger end. Axis 1·5–1·6 in., diam. 1·05–1·15 in.

## Family ARDEIDÆ.

126. *ARDEA PURPUREA*, L.*Ardea purpurea*, Motl. & Dillw. *t. c.* p. 34.

Mr. Motley mentions his having met with the Purple Heron once in Labuan.

127. *DEMIEGRETТА SACRA* (Gm.).*Demiegretta sacra*, Salvad. *t. c.* p. p. 346.*Ardea jugularis*, Motl. & Dillw. *t. c.* p. 58.

Native name "Kawowie Kelam" (*Treacher*). "Generally found in freshwater swamps; not uncommon; I have observed several near Victoria" (*Ussher*).

128. *HERODIAS NIGRIPES* (Temm.).*Herodias nigripes*, Salvad. *t. c.* p. 349.*Ardetta garzetta*?, Motl. & Dillw. *t. c.* p. 35.

"Like *Butorides javanica*, moderately common on the sea-shore (*Ussher*).

## 129. BUTORIDES JAVANICA (Horsf.).

*Butorides javanica*, Salvad. *t. c.* p. 351.*Butorides macrorhyncha*, id. *t. c.* p. 353.*Ardea javanica*, Motl. & Dillw. *t. c.* p. 59.

Governor Ussher says that this species is "moderately common about rocks on the sea-shore." According to Mr. Treacher the native name is "Ulun tukugong."

## 130. ARDETTA CINNAMOMEA (Gm.).

*Ardetta cinnamomea*, Salvad. *t. c.* p. 354.

Two adult specimens, sent by Mr. Treacher.

## Order ANSERES.

## Family PELECANIDÆ.

## 131. TACHYPETES AQUILA (L.).

*Tachypetes aquila*, Sharpe, Report of the Transit-of-Venus Exped., Birds of Kerguelen, p. 51.

Mr. Treacher sends one specimen of the large Frigate-bird from Labuan with white head and white breast. Native name "Alang zambongan."

## 132. TACHYPETES MINOR (Gm.).

*Tachypetes minor*, Salvad. *t. c.* p. 364.

This species was included by Count Salvadori in his work as a bird likely to be met with in Borneo. An adult and a young specimen are sent by Mr. Treacher, with the same native name as the larger Frigate-bird. The red colour of the bill and the much shorter wings and toes induce me to believe that the smaller Frigate-bird is a good species, which I was inclined to doubt when I wrote my report on the Kerguelen birds.

## 133. PLOTUS MELANOGASTER (Penn.).

*Plotus melanogaster*, Salvad. *t. c.* p. 367.

Sent by Governor Ussher.

## 134. SULA PISCATRIX (L.).

*Sula piscatrix*, Salvad. *t. c.* p. 368.

Native name "Kulu kulu" (Treacher). Mr. Treacher's specimen is a young bird in brown plumage. The species is new to Borneo, though included by Count Salvadori as a bird likely to occur.

## Family LARIDÆ.

## Subfam. STERNINÆ.

## 135. STERNA BERGII, Licht.

*Sterna bergii*, Saunders, P. Z. S. 1876, p. 657.

*Sterna cristata*, Steph., Salvad. *t. c.* p. 376; Motl. & Dillw. *t. c.* p. 61.

Native name "Tara tara" (Treacher). Governor Ussher's col-  
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lection contained this species as well as Mr. Treacher's; but it was already recorded from the locality by Motley and Dillwyn.

136. *STERNA MELANAUCHEN*, Temm.

*Sterna melanauchen*, Saunders, P. Z. S. 1876, p. 661.

Common in April, May, and June, according to Governor Ussher.

137. *ANOUS MELANOGENYS*, Gray.

*Anous melanogenys*, Sharpe, Report Trans. Venus Exped., Birds of Rodriguez, p. 10.

One adult specimen sent by Mr. Treacher. Native name "Tara tara." I have shown the specimen to Mr. Howard Saunders; and he confirms the identification.

3. On the Conformation of the Thoracic Extremity of the Trachea in the Class Aves.—Part I. The Gallinæ. By A. H. GARROD, M.A., F.R.S., Prosector to the Society.

[Received October 31, 1878.]

Inspection of the windpipes of several species of allied birds makes it evident that the bifurcation of that tube to form the bronchi is brought about in different ways in almost every case, by various alterations of greater or less degree in the proportionate development of the several rings and semirings entering into the composition of the organ. In the case of the non-oscine Passeres, Johannes Müller has proved the great importance of the study of the "lower larynx" or syrinx in the determination of the affinities of the species. In the present communication it is my desire to continue his line of investigation to other families of the class, laying more stress on the cartilaginous structures, and less on the muscles moving them. Opportunities are specially in favour of my studying the Gallinæ at the present time; therefore this first fasciculus is an account of the bifurcating windpipe in those species of the Order which it has been my good fortune to examine.

By C. J. Temminck, in his valuable 'Histoire Naturelle Générale des Pigeons et des Gallinacés'<sup>1</sup>, several of the windpipes of the Gallinæ are figured. These will be mentioned when the respective species are discussed.

It is in the Peafowl that the thoracic termination of the trachea is less complicated, as far as my experience goes, than in any other Gallinaceous bird; and the arrangement is so simple that it is not easy to imagine one much more so<sup>2</sup>.

In the chick (a month old) of *Pavo spicifer* (figs. 1, 2) the anteultimate tracheal ring is free, and agrees with those above it in that the interannular intervals are reduced to a minimum, at the same time

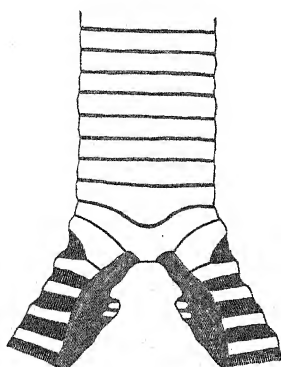
<sup>1</sup> Amsterdam, 2 vols., 1813 and 1815.

<sup>2</sup> Vide Temminck, *loc. cit.* pl. i. fig. 2.



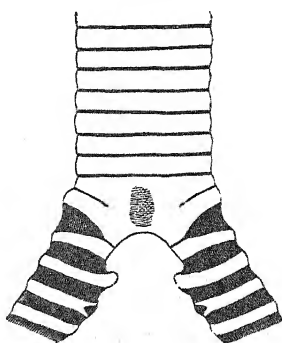
that anteriorly it is slightly bent downwards in the middle line, to assist in the changes of form connected with the bifurcation of the tube. The penultimate ring, from its position, is more pronounced in this respect, whilst posteriorly the pessulus runs up to blend with it, not at its inferior margin, but by a wedge-shaped cartilaginous expansion, the apex of which touches the lower margin of the ring above. That this is so is proved by the existence of two oblique indented lines, one on each side, converging superiorly, where they nearly meet to form the apex of the just-mentioned wedge. The last tracheal ring anteriorly sends down an obtuse median process, the inferior margin of which constitutes the summit of the notch

Fig. 1.



Front view.

Fig. 2.



Back view.

*Pavo spicifer* (adult).

N.B.—This and all the subsequent diagrams are drawn to one scale, and have no relation to the actual size of the structures.

between the divaricating bronchi, whilst its posterior surface forms the anterior attachment of the pessulus. Posteriorly this ring is incomplete, the two obliquely truncated ends being separated by a considerable interval occupied by the pessulus in the middle line, and laterally by the commencement of the membranous inner walls of the bronchi.

In the middle of the upper border of the penultimate ring anteriorly a white line is seen sending a limb down on either side, beyond the ring itself, onto the next, at the lower margin of which it ceases at the root of the obtuse median process. Such an appearance indicates that in the older bird fusion of the two rings will occur at the spot, as an inspection of the part in the adult verifies. From the above description it will be also seen that the pessulus—a slender cylindroid bar, expanded and flattened at each end—is anteriorly attached to the last, and posteriorly to the penultimate

ring of the trachea. The last tracheal ring, it must not be forgotten, is incomplete behind.

The first bronchial semiring—for in no Gallinaceous birds are any of the bronchial rings complete—articulates at both its extremities with the last tracheal, anteriorly along the side of the oblique median process, posteriorly with the lower angle of its square-cut termination. Both ends are slightly expanded and obliquely truncated, their acute upper angles being their articulating spots. The lower margin of the last tracheal ring being concave downwards and slightly uptipped laterally, whilst the first bronchial semiring descends slightly from its attachments outwards, a considerable membranous interannular interval is left. The second bronchial semiring is simple, free, and slightly expanded posteriorly. In front the third was bifurcated in both bronchi, on one side each branch being further subdivided. The depth of the bronchial interannular membranes is about the same as that of the semirings themselves.

Between the membranous inner wall of one bronchial tube and the same part of the other there is a dense fibrous band of union, a short distance below the bifurcation of the windpipe, and generally on the level of the two or three semirings below the second. This band is, I believe, always to be found in birds (it will be termed the *bronchidesmus* in this communication) developed to a greater or less extent. Being of fibrous tissue and connected with the membranes of the neighbourhood, anatomists have removed it whilst dissecting the organ for examination. Its importance, however, is more considerable than might be at first imagined; and I only regret that in many of the subjoined descriptions I took no note of it. In birds like the Tetraonidæ the bronchidesmus is so strong that it cannot escape special observation.

The adult female presents no modifications of importance. The penultimate and last tracheal rings are relatively a little smaller and have blended in front in the middle line, whilst all trace is lost of the shape of the posterior termination of the pessulus. The articulating surfaces of the first bronchial semiring have become slightly more considerable.

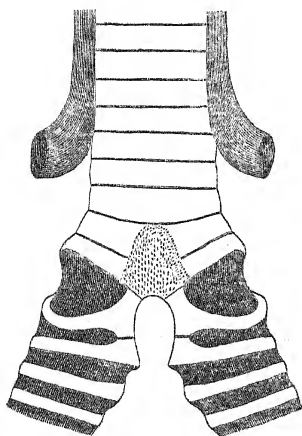
The adult (male) *P. nigripennis* differs in that the antepenultimate tracheal ring blends anteriorly with the penultimate, at the same time that there is a greater fusion between the penultimate and last rings, all three apparently blending behind as well. The interannular interval between the last tracheal ring and the first bronchial semiring is reduced to little more than a line, and the bronchial interannular intervals are very small.

It is to be specially noted that in the genus *Pavo* the second bronchial semiring, by not articulating with the one above it at either end, does not participate in the formation of the specialized lower larynx. This is a feature indicating non-elaboration of the organ. No other Gallinaceous bird with which I am acquainted resembles *Pavo* in this respect.

In *Caccabis rufa* the thoracic extremity of the trachea is perfectly

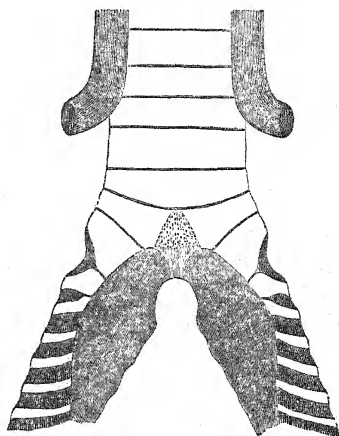
simple, and all the rings are in contact with those contiguous to them throughout their circumference. The lower margin of the penultimate ring faces slightly outwards on either side, whilst in the middle line in front it fuses with the ring below it, a well-defined semiellipsoid ossification developing in the region, upwards as far as the upper margin of the penultimate ring, and downwards to the median point of bifurcation of the last ring, from which it extends laterally a short distance. The pessulus is attached as in *Pavo*. It is ossified, the anterior termination being the ossification just described; the posterior is a triangular extension into the middle of the posterior surface of the penultimate ring, the apex of which reaches its superior margin. The first bronchial semiring is con-

Fig. 3.



Front view.

Fig. 4.



Back view.

*Caccabis chukar.*

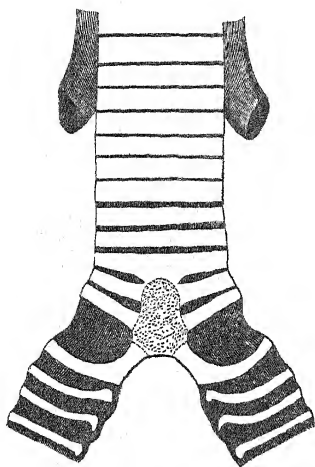
cave upwards, and in front forms a sharp inturned angular process at the spot where it articulates with the anterior extremity of the second semiring. Posteriorly its articular upward-directed process is more developed—so much so that the contour line of the posterior extremity of the last tracheal is continuous with that of the ring under consideration and the next as well. The second bronchial semiring differs but little from those which follow it, except in that it articulates with the one above. Its extremities are somewhat more expanded, and articulate freely with the angles of the first ring. Anteriorly it sends inwards a pointed angular process, which advances further towards the middle line than does the similar angle of the semiring above, with which it closely articulates. The semirings which follow have

also pointed anterior ends, running inwards almost as much as does the second, in a manner very characteristic of all the genera in which the second semiring is pointed and prolonged. There is no trace of any interval between the penultimate and last tracheal rings. Between the last and the first bronchial semiring the interval is a capacious ovoid. That between the first and second bronchial semirings is elongate and shallow, not deeper than the lower bronchial intervals. *Cucubis saxatilis* agrees with *C. rufa*, except that in the former there is a slight development of antero-lateral interannular intervals between the lower tracheal rings, as in *Argus*, the account of which follows.

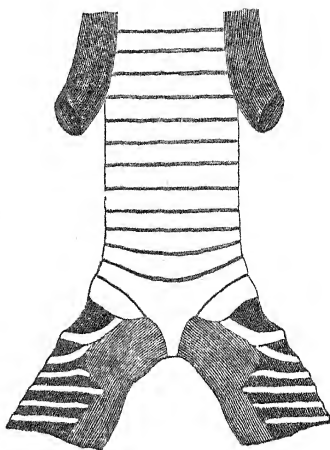
In *Argus giganteus* the lowermost tracheal rings are separated by

Fig. 5.

Fig. 6.



Front view.



Back view.

*Argus giganteus.*

narrow intervals in front, where in the middle line the last three fuse and ossify into a mass whose lower border descends but little below the level of the inferior margin of the unmodified last ring for the articulation of the anterior extremities of the first bronchial semirings. Posteriorly the pessulus joins the penultimate ring, the two hinder ends of the last ring being well separated. The first bronchial semiring is large and strongly convex downwards from the development at each of its ends of upturned articulating processes, at the junction of which with the horizontal portion of the tube the second semiring articulates along its lower border. The interval between each lateral element of the last tracheal ring and its corresponding first bronchial semiring is considerable, tending to a quadrate form, whilst that between the first and second semi-

ring is much narrower and meniscoid. The second semiring itself is strongly convex downwards, articulating behind by its extreme end with the ring above, but in front continuing onwards as a triangle beyond the articular point into the internal bronchial membrane a short distance. The anterior terminations of the few lower bronchial semirings are similarly pointed; and posteriorly they run inwards (especially the fourth and fifth) considerably more than do semirings one and two.

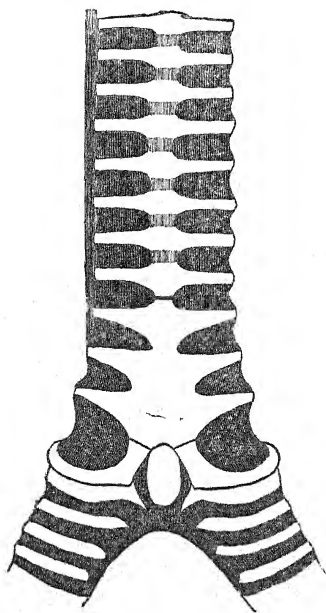
*Polyplectron chinquis* so closely resembles *Argus* in all respects that no description of it is needed. The first and second bronchial semirings are proportionately a little stronger; the antepenultimate tracheal ring does not actually fuse with the penultimate, and in one specimen the pessulus, instead of blending with the penultimate ring behind, runs upwards cuneately between the separated ends of that ring to touch the lower margin of the antepenultimate ring. From this and other facts pointing in the same direction, to be mentioned subsequently, it may, with much probability, be inferred that this arrangement just mentioned is the typical one, consolidation of the pessulus with the posterior extremities of the penultimate tracheal ring having occurred in those cases where, among the Gallinæ, that bar is found connected with it.

In *Ithaginis geoffroyi* (♂ adult) there is a transversely fusiform median interannular interval between the lower tracheal rings anteriorly, entirely absent behind. The antepenultimate and penultimate rings are slightly separated throughout, most at the sides, whilst between the penultimate and last rings—fusing though they do in the middle line anteriorly—there is a slight elongated oblong interval on either side of the fused isthmus, extending outwards as far as the lateral margin of the tube, but not further backwards. The pessulus gives no indication of separation from the penultimate tracheal ring posteriorly, whilst anteriorly it springs from the last ring, between which and the first bronchial semiring there is a considerable interval. This semiring is somewhat squared, sending up processes (an anterior and a posterior) of no great length to articulate with the last tracheal ring, the second semiring (scarcely differing from the third) just touching its two angles sufficiently for it to be said that it does articulate with it. In this species the lateral sterno-tracheal muscle terminates inferiorly in a peculiar manner. It is constituted of two parts, an outer and an inner. Of the inner, which is also divided below into two, the median portion ceases at the twelfth ring from the bifurcation, opposite which spot its outer moiety sends downwards a special thin extra broad fasciculus to join the undivided outer main element of the muscle just before it leaves the windpipe, opposite its antepenultimate ring. The nerve to these lower fibres is not small; and from being superficial—resting as it does on the muscles under consideration as they descend—it disappears behind the special fasciculus above described at the spot where that begins to run inwards towards its fellow, which it does not meet.

In *Lophortyx californicus* (adult male) there are no interannular

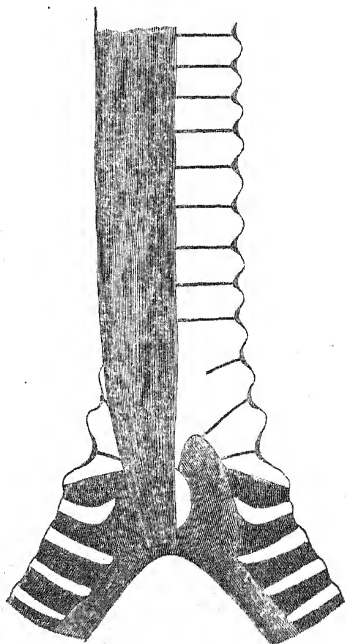
intervals on the posterior aspect of the intrathoracic portion of the windpipe [as in so many of the birds under consideration, and dependent, no doubt, upon the proximity of the œsophagus]; but anteriorly the lowermost twelve rings are thinned in such a way that the intervals are uniform and deeper than the rings forming them, at the same time that their breadth is half the circumference of the tube itself, they continuing across the middle line, except in the case of the lowermost three, which are divided up by median junc-

Fig. 7.



Front view.

Fig. 8.



Back view.

*Lophortyx californicus.*

tions of the rings, narrow and not fused between the antepenultimate and the one above it, broad and blended in the two below it. There is a narrow medio-anterior vertical fibrous bond between all the upper thinned rings, taking the place of the lower cartilaginous isthmuses. Posteriorly the penultimate and antepenultimate rings blend in the middle line, the pessulus joining the former in the usual manner. The last ring is typical and incomplete behind. The first bronchial semiring is large and concave upwards.

It develops a considerable angle on its convex border in front, at the spot where the next semiring meets it. Behind it is peculiar from its inconsiderable thickness, it meeting the corresponding extremity of the last tracheal ring for some distance, opposite which part it is so narrow that the expanded hinder end of the second semiring does not manage to reach it, and remains separated by a small interval. This second semiring meets it in front, and sends inwards beyond the articulating spot a pointed process of some length. The lower bronchial rings are similarly pointed and prolonged in front.

The bronchidesmus is powerful, at the same time that its posterior margin is the place of insertion of the pair of contiguous powerful muscles that runs down the back of the windpipe, and spreads laterally so much as to be just seen in the anterior view of the organ.

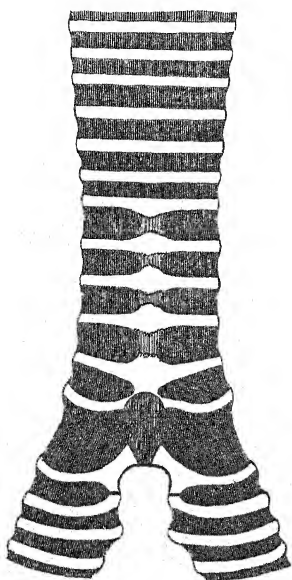
The windpipe of *Oreortyx pictus* differs in detail from that of the bird just described. The penultimate and last rings of the trachea blend in the mid- anterior and posterior line; whilst behind the antepenultimate does so also, articulating in front. The next four rings anteriorly are lozenge-shaped in the middle line, the six above which are uniformly thinned; but the intervals between them are much less considerable than in *Lophortyx californicus*. Posteriorly there are no interannular intervals at all. The bronchial semirings, the posterior muscles, and the bronchidesmus are as in *Lophortyx*.

In *Arboricola atrogularis* the bifurcating portion of the windpipe most closely resembles that of the American Quails. With no posterior interannular intervals, those in front are deep and twelve or so in number, being interrupted, in the case of that between the last and penultimate rings, by a large medio-anterior lozenge-shaped ossification which unites them, but continuous above except that a fine fibrous band runs up the tube, as in *Lophortyx*, previously described. The thinned antero-lateral element of the last ring has a slight special downward curve towards its inner end. In *Oreortyx* there is an indication of the same. The second bronchial semiring is prolonged inwards pointedly in front, and posteriorly *does* meet the first semiring to articulate slightly with it.

In *Coturnix communis*, with which *C. coromandelica* agrees in every respect, the posterior surface of the intrathoracic portion of the trachea is seen to be formed by rings between which no interannular intervals exist, except as transverse lines. Anteriorly, however, the rings are very much thinner, becoming so abruptly at the side of the tube, and the intervals between them are nearly twice their depth, even more than that towards the bifurcation of the tube. Narrow medio-anterior perpendicular isthmuses of fibrous tissue connect the lowermost six rings. Laterally the penultimate ring is slightly upturned, more behind than in front. The antero-lateral thin portion of the circumference of the last ring is decidedly convex downwards, as is also the first bronchial semiring and the second. The last tracheal ring sends downwards a medio-anterior oblong process, ossified in the adult, to the lower angles of which

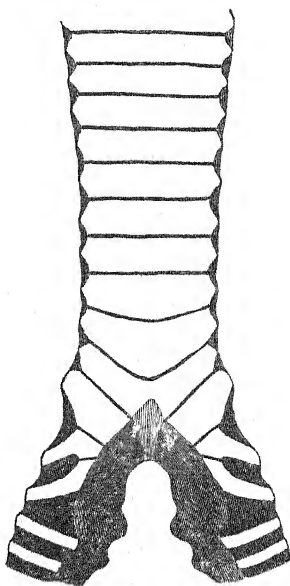
the first semirings articulate by their equally lengthy extensions inwards beyond the short articular processes for the second semirings. The posterior articulations of the incomplete last tracheal ring with the first semiring, and of that with the second on each side, are considerable, and much the same in detail as in *Cuccabis*. The pessulus blends with the penultimate ring behind. The lateral intervals between the penultimate and last rings are plano-convex, the plane side being uppermost; those between the last ring and the first bronchial semirings are meniscoid, very deep, and concave upwards. Between the first and second semiring the interval is small, elongate, and curved like the one above it.

Fig. 9.



Front view.

Fig. 10.



Back view.

*Coturnix communis.*

*Ptilopachys ventralis* differs very little from *Coturnix* in this part of its windpipe.

*Rollulus coronatus* closely resembles the Oxytyxes and Quails. There are five fairly deep antero-lateral interannular intervals between the lowermost six tracheal rings, these same rings meeting in the middle line in front as well as through all the posterior moiety of the circumference. Ossification extends through the median fused anterior portions of the penultimate and last tracheal rings, as well



as a short distance posteriorly into the middle of the lower border of the penultimate ring, from the fair-sized bony pessulus. The last tracheal ring sends downwards a thick short process from its hinder end on either side, to articulate with the equally developed upturned posterior extremity of the first bronchial semiring, the anterior upward- and inward-directed terminal limb of which is proportionately long, at the same time that the angle it makes with the main element of the ring is very abrupt. The second semiring is nearly in contact superiorly with the first throughout its length. Anteriorly it ends in a point, as do the lower semirings, which extends a short distance into the inner membranous wall of the bronchus. Posteriorly it is slightly enlarged and rounded, ceasing a short distance outside the posterior angle of the semiring above, with which it is in contact.

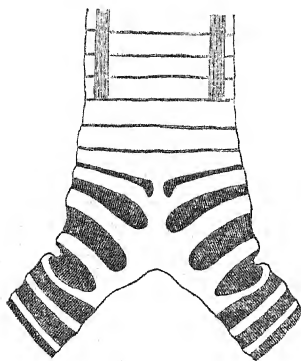
Turning to the genus *Euplocamus*, in *Euplocamus swinhoii* the last four tracheal rings become slightly enlarged from above downwards. Between the simple antepenultimate ring and the one above it there is a slight interval, except in the middle line behind, where a general fusion of the last three rings occurs, as in all *Euplocami*. The penultimate ring sends downwards a narrow tongue-shaped median process anteriorly, which touches, but does not join, the upper margin of the there indented terminal tracheal ring. Its upper margin is also slightly irregular. The last ring is peculiar in front. Besides the shallow and broad concavity in the middle of its upper border, it sends downwards a deep and transversely considerable semi-ovoid process, notched at its apex, which is lowermost, to form the median element of the actual bifurcation of the tube. On either side of this notch, just beyond it, the anterior extremity of the first bronchial semiring articulates by its triangularly expanded end, the lower angle of which is jointed with the not much specialized second semiring, which posteriorly articulates by its somewhat expanded termination with the first semiring also. The hinder extremity of the first semiring fuses with the last tracheal, as does the posterior termination of the pessulus, to form a continuous cartilage along the back of the tube as high as the upper border of the antepenultimate tracheal ring. Antero-laterally the annular interval between the penultimate and last rings is well developed, and bent downwards near the middle line on account of the presence of the process and notch above described. The interval between the last tracheal ring and the first bronchial semiring is very large and deep on account of the great size of the descending process of the former. The interval between the first and second semirings is ovate and slightly deeper than those which follow. The pessulus is narrow.

*Euplocamus praelatus*, *E. nychthemerus*, and *E. albocristatus* differ from *E. swinhoii* in that anteriorly the median process from the lower border of the penultimate ring blends with the upper border of the last tracheal, as does the upper border, but by a more slender isthmus, with the antepenultimate. In *E. nychthemerus* and *E. albocristatus* there is a further fusion of the anterior extremity of the

first semiring with the last tracheal at its (should be) articulating spot.

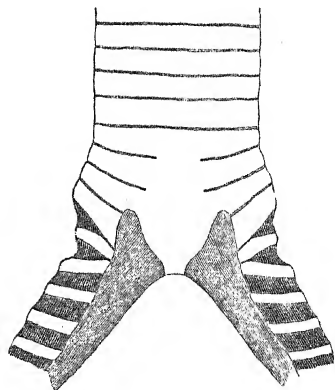
The pessulus is broad; and the angle on each side of its posterior blending with the penultimate ring runs a short way into the latter so as to reduce its depth a little at the spot. The interannular intervals are the same as in *E. swinhooi*, except the one between the antepenultimate and penultimate rings, which is interrupted in front by the narrow cartilaginous isthmus between them. Above this the following twelve rings or so touch all round; and they are succeeded by typically interlocking rings in the cervical portion of the tube. It must be also mentioned that whilst the plane of the penultimate tracheal ring is transverse, that of each lateral moiety of the

Fig. 11.



Front view.

Fig. 12.



Back view.

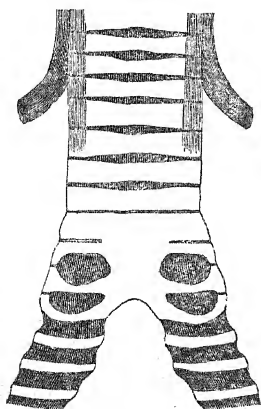
*Euplocamus alboeristatus.*

last one, as well as the first bronchial semiring, runs upwards from its more fixed median anterior and posterior parts. The plane of the second semiring makes an angle of some  $15^\circ$  with the first.

In this last respect, as well as others, the genus *Phasianus* differs from *Euplocamus*. In *Phasianus wallichii*, *P. colchicus*, and *P. versicolor* the plane of each tracheal ring, as well as that of the uppermost bronchial semirings, is nearly, if not perfectly, transverse. The whole trachea narrows slightly at its lower end, to expand again opposite the last two or three rings. As in *Euplocamus*, the last three rings fuse in the middle line behind, as do the last two (in *P. wallichii* the last three) in front, whilst in adult birds the anterior extremities of the first and second semirings participate in the blending, as does the pessulus posteriorly. In *P. colchicus* and *P. versicolor* (which differ from *P. wallichii* about as much as *Euplocamus swinhooi* does from its allies) there is a robustness about the

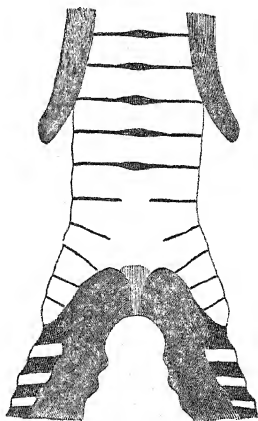
last two tracheal rings and the first two bronchial semirings peculiar to them. Their direct front view always exhibits the posterior articulation of the first bronchial semiring with the ring above and the semiring below, as in no other Gallinaceous bird with which I am acquainted; thus, it includes the whole of the considerable inter-annular intervals between them, the upper ovoid, the lower semi-ovoid, with its convexity downwards. In *Phasianus* there is no interval between the penultimate and last tracheal rings, nor any of importance higher up. In *P. colchicus*, however, above the ante-

Fig. 13.



Front view.

Fig. 14.



Back view.

*Phasianus colchicus.*

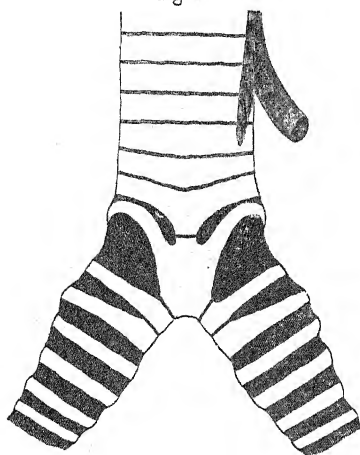
penultimate ring, there are small median intervals, fusiform and elongate in front, minute behind. These shortly become the notches of the interlocking superior rings.

*Pucrasia darwini* is so like the genus *Phasianus*, as far as the parts under consideration are concerned, that it needs no separate description. Any difference is in the direction of *Euplocamus*, the sides of the last tracheal ring being slightly uptilted.

Returning to *Euplocamus*, a start in another direction brings us to *Thaumalea*, *T. picta* and *T. amherstiae* being identical, as far as their windpipes are concerned. In this genus the intrathoracic rings (tracheal rings) are in contact all round, as far as and including the penultimate ring, which sends down a short median anterior process to articulate with a small corresponding upward-directed one from the upper margin of the last ring. Posteriorly, in the young bird, the blunted triangular extremity of the pessulus interpolates itself between the two slightly expanded ends of this (therefore imperfect) ring, its extremity meeting and even disrupting

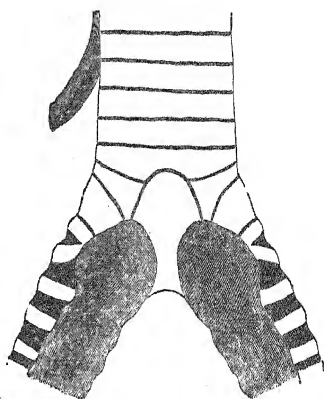
the continuity of the lower edge of the antepenultimate ring to a small extent. The last tracheal ring is characterized by the great obliquity of the plane of each of its lateral moieties, the downturned angle between which is less than  $45^\circ$ . Behind there is a considerable interval between its downward-directed ends, filled up by the pessulus, which is prevented from touching them by the intrusion of the extremities of the similar parts of the, also incomplete, penultimate ring. In front the middle of the ring is expanded into a large, quadrilateral, square-set cartilage, ossified in the adult, from the superior angles of which the slender oblique side elements of the ring take origin, to the inferior angles of which the first bronchial semiring is articulated in the chick and consolidated in the adult;

Fig. 15.



Front view.

Fig. 16.



Back view.

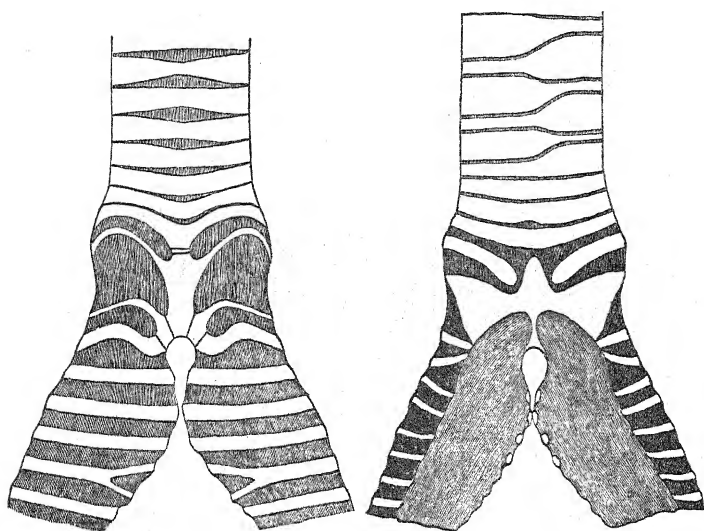
*Thaumalea picta.*

the middle of the superior margin of which also articulates or blends with (according to the age) the broad median descending process of the penultimate ring. The first and second bronchial semirings are much alike; both are slightly swollen at their extremities, especially the anterior; and their planes of direction are parallel, which is not the case in *Euplocamus*. The lateral intervals between the penultimate and last tracheal rings are like the section of a plano-concave lens with the concavity (formed as it is by the arch of the lateral moiety of the last ring) downwards. The interval between the last ring and the first bronchial semiring is considerable and broadly fusiform; that between the first and second semiring is narrow and lanceolate, or fusiform in the adult, where the two semirings consolidate at their extremities.

*Lagopus scoticus* is not far different from *Thaumalea* in certain respects. The lower intrathoracic rings of the trachea are but little modified above the antepenultimate, there being slight median fusi-form anterior interannular intervals, whilst posteriorly the ununited rings are keyed together, as in the middle of the windpipe generally. The penultimate ring agrees with the same in *Thaumalea*, even to being incomplete behind, the free ends slightly receding from the ring above. The last ring anteriorly agrees with the same genus in detail, its lateral arched moieties being even more slender and delicate. Posteriorly, however, its ends develop into large fairly equilateral triangular expansions, continuous with the slender lateral arch at its supero-external angle, articulating with the posterior end of the first bronchial semiring at its inferior angle, whilst its supero-

Fig. 17.

Fig. 18.



Front view.

Back view.

*Lagopus scoticus.*

internal angle joins a similar development at the side of the pessulus, the hinder part of which expands into a sagittate cartilage, the blunted apex of which is directed upwards to meet the middle of the inferior margin of the antepenultimate ring of the trachea. The main bar of the pessulus is very slender; and all the structures under consideration are built up of a much more yielding cartilage (without ossifying tendencies) than in any non-tetraonine birds. The first and second bronchial semirings are parallel to one another in course throughout, and are more uptilted laterally than in *Thaumalea*. Pos-

teriorly they are not expanded and scarcely touch; anteriorly they expand a little and articulate freely. The interannular intervals in essential points are not different from the preceding genus. The bronchial semirings below the second are peculiarly lengthy; their extremities turn inwards toward one another, and so slightly intrude into the membranous inner wall of each bronchus. One or more of the semirings may be bifid at their anterior ends. The bronchidesmus is particularly powerful in the Tetraonidæ, including *Lagopus*, and, as it were, pulls the two tubes into nearer relationship than would otherwise appear to be their tendency.

*Lagopus mutus* agrees with *L. scoticus* in every respect.

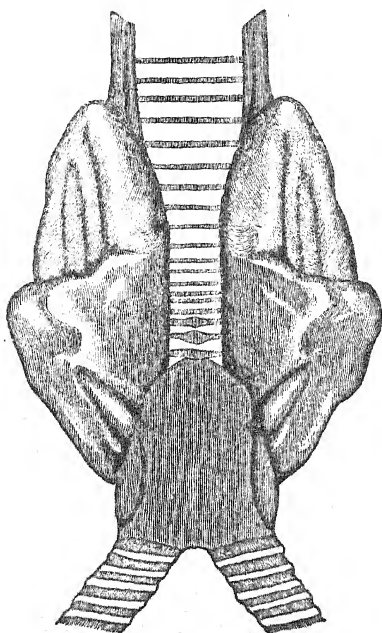
*Tetrao urogallus* and *T. tetrix* conform to a type which has several important differences from *Lagopus scoticus*, although in common they have the yielding cartilaginous (and never ossified) rings throughout the organ under consideration, as well as the great development in length of the bronchial semirings beyond the second.

In the female of *Tetrao tetrix* the first feature that strikes the observer is the consolidation of all the intrathoracic tracheal rings along the mid-posterior surface into a vertical bar, rendered more than it would be otherwise conspicuous by the considerable thinning of the lateral third or more of each ring on each side, and the consequent formation of lateral interannular spaces slightly deeper than the rings enclosing them. In the adult bird no trace of the transverse lines of junction between the constituent transverse annular elements of this vertical posterior bar can be seen; in the young bird, however, they are conspicuous. Anteriorly the rings above the antepenultimate are separated by an interval which slightly reduces the lowest of them, and that only, towards the middle line. There is a median semifusion in front, of considerable breadth, between the antepenultimate and penultimate rings, below which a broad cordiform cartilage represents the fused mid-anterior elements of the penultimate and last rings, with which the anterior extremity of the first bronchial ring is blended, and the second articulates, in such a way as to form lateral extensions of its apex. The line constituting the actual angle between the contiguous sides of the brouchi—produced, as just indicated, by the apex of the cordiform cartilage, together with the inferior margins of the lateral expansions, composed of the anterior ends of the first and second bronchial semirings—is less concave downwards than in *Lagopus* (in fact almost straight), and much less so than in the other Gallinæ. It has, in *Tetrao*, a very slight descending protrusion in the actual centre—the apex of the cordiform cartilage. Posteriorly each free end of the last tracheal ring expands and sends downwards and outwards a small process for the articulation and fusion with the similarly enlarged extremity of the first bronchial semiring. Upwards it blends with the base of the vertical posterior cartilage, which is considerably broader opposite the lowermost three tracheal rings than higher up. Into the middle of its base the narrow pessulus is seen to run. There is a great similarity between the depth and shape of all the interannular intervals in the bifurcating portion of the tube, the compara-

tively great depth of the intervals between the lateral parts of the last tracheal and the first bronchial semiring, observed in *Thaumalea* for instance, not being seen. The first and second bronchial semirings themselves, agreeing as they do with those of *Lagopus* in all respects, are of the same thickness as their neighbours both above and below—the result being simplicity of construction a little more apparent than real. Many of the bronchial semirings are bifid at their anterior extremities.

In the male of *Tetrao tetrrix* the trachea is most extraordinary. At first sight the deeply situated intrathoracic part appears to have

Fig. 19.



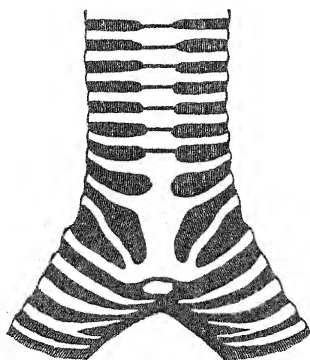
Front view.  
*Tetrao tetrrix*, ♂.

no similarity with that of the female, there being developed, on each side, an immense irregular tumefaction, communicating with its fellow by means of a bridge of fatty tissue which covers the anterior portions of the lowermost tracheal rings. When preserved in spirit this tumefaction shrinks to a comparatively small size, to swell to its original bulk upon immersion in water. This leads me to suppose that it is composed of "mucous" tissue, like that of the umbilical

cord, which it resembles in consistence. The "mucous" tissue in this case is entirely developed between the external fibrous covering of the windpipe and the middle ring-carrying layer, the rings themselves not varying in the least, as far as I can detect, from their arrangement in the female.

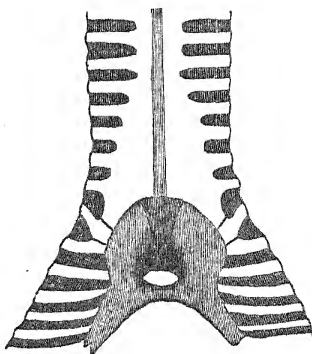
*Tetrao urogallus* (a male, not quite full-sized, and without any trace of the cervical loop developed) differs from the female of *T. tetrix* only in a few details. All the rings and semirings are thinner, and the interannular intervals greater. The posterior vertical bar is undistinguishable. Anteriorly, however, the lowermost seven tracheal rings are not thinned in the middle line, where they, above the penultimate, articulate above and below to form what becomes almost an anterior vertical bar as well. The corresponding parts of the

Fig. 20.



Front view.

Fig. 21.



Back view.

*Tetrao urogallus.*

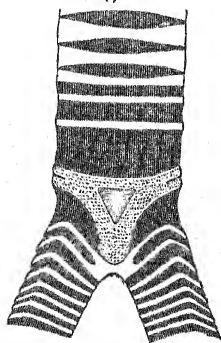
penultimate and last rings, considerably narrower than in *T. tetrix*, expand and consolidate into an elongate lozenge, with a much shorter one above it, from the lateral angles of which the rings are continued, and from the inferior angle of the lower of which the articulating (and subsequently fusing) surfaces for the anterior ends of the first bronchial rings arise. The second semiring also articulates with the first, as in the allied birds, with, however, a considerably larger interannular interval than in *T. tetrix*. The lateral parts of the first semiring being markedly convex upwards, at the same time that the incurved last tracheal ring sends downwards rather lengthy processes from its posterior extremities as well as the deep lozenge-shaped cartilage in front, the interval between the two agrees with the section of a plano-concave lens. Some of the bronchial semirings are bifid at their extremities; and the bronchidesmus is very strong.

*Tetrao cupido* is intermediate in its tracheal bifurcation between *Lagopus scoticus* together with *L. mutus*, on the one hand, and *Tetrao*



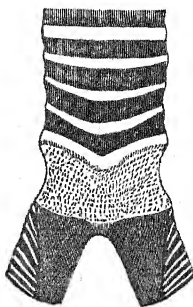
*urogallus* with *T. tetrix* on the other. Its cartilages are considerably less yielding than those of either genus; and the lower tracheal rings, instead of fusing behind to form a continuous longitudinal bar supporting the remaining parts of the rings upon each side, remain separate, in close contact, for the posterior half of their circumference. The pessulus interpolates its considerable cuneate posterior end as high as the antepenultimate ring, which it splits up. The lowermost nineteen tracheal rings are considerably thinned in front, the uppermost being least so. Of these, the antepenultimate ring, as well as the one above it, give indications of being bent downwards in the middle line in front. This angulation is more marked in the penultimate ring, and most so in the last ring, where a mid-anterior rhombic cartilage exists, of exactly the same shape as in *Lagopus scoticus*. The first and second bronchial semirings agree precisely with those of the last-named species, convexly upwards as they are curved; and, as in all the species of *Lagopus* and *Tetrao*, the bronchidesmus is strong, at the same time that the bronchial semirings almost completely encircle the tubes, leaving a very narrow membranous unsupported wall. The bronchial tubes are comparatively lengthy.

Fig. 22.



Front view.

Fig. 23.



Back view.

*Perdix cinerea.*

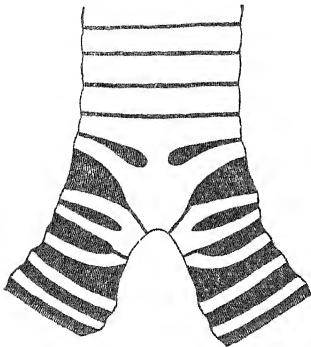
In *Perdix cinerea* the intrathoracic portion of the trachea is quite different from the same in *Caccabis* or any of the birds above described. The last and penultimate tracheal rings are much developed, and blend to form the considerable three-way piece, which is triangular in front, apex downwards, and horizontally oblong behind. Of the anterior triangle, which is ossified, the two sides are formed by the last ring, whilst the penultimate ring constitutes the base, the intervening interval being filled up with a thin cartilage. The apex of the triangle is continued downwards in cartilage, this latter being deeply notched in the middle line, at the same time that the anterior extremities of the first and second slender and upward-arched bron-

chial semirings blend with it laterally. Laterally, the separation between the last and penultimate rings is feebly indicated, as it is posteriorly by the non-ossification of the latter, notwithstanding the blending of the two. Posteriorly the oblong ossified cartilage, with its unossified and slightly indented upper margin (the part formed by the penultimate ring), is joined by the slender pessulus in the middle of its lower edge, whilst it is with its lower extreme angles that the simple posterior extremities of the first bronchial half-rings blend, the same parts of the second semirings not participating in the fusion, and being almost if not quite free, as are those below it at both ends. All the upper bronchial semirings are slender, strongly convex upwards, and separated by intervals not greater than their depth. The interval between the last tracheal ring and the first semiring, to which it is united both in front and behind, is fairly deep and crescentic. The antepenultimate ring is very much slenderer than the one below it, from which it is separated by a large interannular interval, deeper in front than behind on account of the obliquity of its plane. Anteriorly it is very shallow and insignificant; and it gradually enlarges as it goes backwards. The ring above it is scarcely different, but slightly less oblique, the interannular interval between it and the fifth from the end being slightly less than that next lower down. This fifth ring first gives indications of a latero-posterior deepening, with a corresponding reduction of the interannular interval and the formation of an antero-median horizontal fusiform space, the only remains of the interannular interval recognizable higher up, and extending into the cervical portion of the windpipe.

*Cerionis temmincki* differs from all other Gallinæ examined by me, except *Francolinus vulgaris*, in that the *third* bronchial semiring articulates with the second, and so participates in the formation of the specialized organ under consideration. None of the tracheal rings are narrowed; and there are consequently no interannular intervals of any kind, if we except the one on each side of a narrow anterior isthmus which runs between the penultimate and the last ring. This interval is guttate in shape, on account of the slight upturning of the lateral element of the last ring, the antero-median part of which is expanded, almost exactly as in *Euplocamus*, into a quadrate cartilage. The pessulus at its posterior extremity is unattached, though situated as usual. Its freedom depends upon the fact that the penultimate as well as the last tracheal ring is incomplete behind, the end of the pessulus filling the deficiency and just touching the lower margin of the complete antepenultimate ring. This may possibly be the normal arrangement, all others resulting from subsequent consolidation. The first and second bronchial semirings are very much alike. The relations of the upper of them to the ring above, as well as those of the lower to the ring below, are almost identically those of *Euplocamus*; whilst posteriorly they consolidate together for one half their length, a small elongate fusiform interval existing external to their anterior fused extremities. With the lower of them the slightly-bowed third semiring articulates

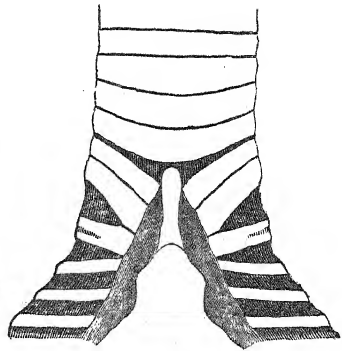
at one end, and the other (as does the second in *Euplocamus*) with the first. *Ceriornis satyra* agrees exactly with *C. temmincki* in its lower larynx.

Fig. 24.



Front view.

Fig. 25.



Back view.

*Ceriornis temmincki.*

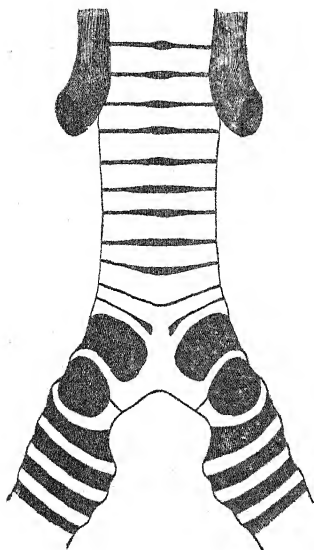
My acquaintance with the trachea of *Francolinus* is confined to *F. vulgaris*, an early sketch, too, only of that. Its great peculiarity is that the first three bronchial semirings articulate together, the third being decidedly the strongest, the first and second being separated by a greater interval than exists in *Ceriornis*.

In *Crossoptilon mantchuricum* the thoracic end of the trachea is euplocaminc in construction. It narrows considerably near its termination, at which it again expands. The only indications of interannular intervals are small medio-anterior fusiform spaces, absent between the antepenultimate and penultimate rings, and replaced by a fusion in the case of the last two, on each side of which the lateral separation between the rings expands into a minute triangular interval, smaller than in *Euplocamus*. The pessulus agrees with that of the *Euplocami*. The interval between the last tracheal ring and the first bronchial semiring is very large, both upper and lower margin being about equally convex upwards, from the shape of the last tracheal ring and the uptilting of the first semiring. The interval between the first and second semirings is scarcely smaller, and is ovoid, the latter semiring being decidedly downturned laterally, bent upwards abruptly near its ends, and particularly strong throughout. On the whole, the organ is more like that of *Phasianus* than *Euplocamus*, its most striking difference from the former being the lateral uptilting of the first bronchial semiring, and the similar tendency in the sides of the last tracheal ring.

In *Lophophorus impeyanus* the lower tracheal rings, which are narrower than those above, are in contact with one another behind;

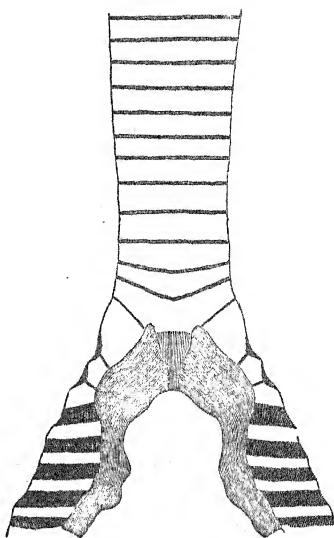
but anteriorly they are thinner, leaving considerable intervals, diminishing as they ascend—continuous between the five rings above the penultimate, found also between it and the last, but in that case interrupted by a small median connecting isthmus, which is broader below than above, at the same time that it is continuous with the superiorly broader medio-anterior descending process of the last ring, the two together forming a lozenge-shaped cartilage that receives the extremities of the first semirings at its lower margin. Posteriorly the pessulus is continuous with the penultimate ring, whilst the ends of the last tracheal also blend with it slightly. The second bronchial semiring is slightly larger than the first, and articulates with it in the usual way, as does the first with the last tracheal ring. There is a great uniformity in the depths of all the interannular intervals in the region of the bifurcation of the trachea.

Fig. 26.



Front view.

Fig. 27.



Back view.

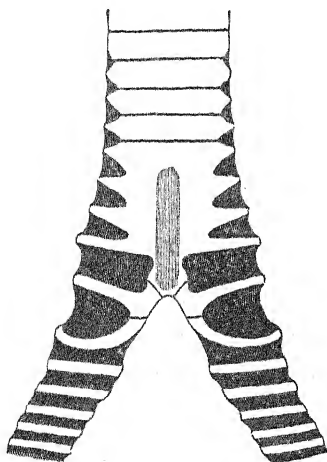
*Crossoptilon mantchuricum.*

In *Numida cristata*, which may be taken as the type of the very characteristic windpipe of the genus, figured accurately as it is in part by Temminck<sup>1</sup>, the peculiarity is that the lowermost six or so tracheal rings develop antero-lateral fenestræ between them, increasing in size from above downwards, and produced by the thinning

<sup>1</sup> *Loc. cit.* pl. i. fig. 4.

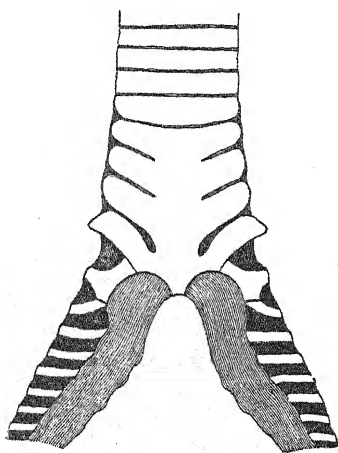
of the rings alone. In the adult male the four lowest rings blend in the middle line, both anteriorly and posteriorly. Those higher up do not do so. The last ring of the trachea, the whole plane of which is transverse, sends downwards a bluntly triangular medio-anterior process, with the lower margin of which the first bronchial semirings articulate. Posteriorly, in the full-grown bird, the pes-sulus fuses with the hinder extremities of the same, in such a way as to make it appear to form a continuation of it, as in no other of the Gallinæ with which I am acquainted. The first bronchial semiring sends upwards at right angles a strong anterior articular process, it posteriorly expanding triangularly, so that the upper angle meets the lower margin of the last tracheal ring in the usual

Fig. 28.



Front view.

Fig. 29.



Back view.

*Numida cristata.*

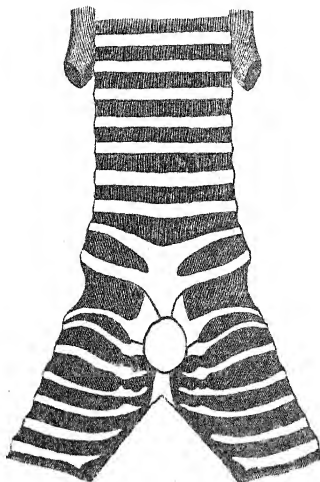
situation, the lower angle articulating with the second semiring, whose other end bends up to be jointed to the corresponding part of the first semiring, developed slightly downwards to articulate with it. The interval between the last tracheal ring and the first bronchial semiring is considerable and broadly quadrilateral; that below it is much shallower; and those above are fusiform, diminishing gradually as they ascend, until the last is quite minute.

*N. ptilorhyncha* and *N. rendalli* are very similar. They agree with one another, and differ from *N. cristata* in that the extreme lateral edges of the penultimate and last tracheal rings meet and blend, thereby reducing the interannular interval to a guttate form,

with the apex directed outwards. In *N. vulturina* there are as many as ten pairs of lateral tracheal fenestræ.

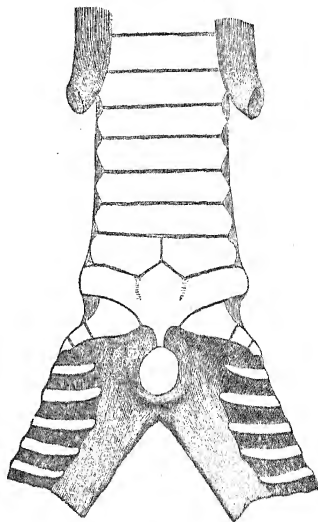
In *Meleagris gallopavo* the intrathoracic rings are all thinned away in front, whilst posteriorly they are not so, the consequence being that considerable interannular intervals separate them anteriorly, entirely absent posteriorly. The antepenultimate and penultimate rings are alone joined by a median anterior isthmus of cartilage. The former of these is split across behind; the latter is not so, the fairly thick pessulus blending with the mid-posterior margin, its apex apparently producing a protrusion of its upper border between the sides of the fissure in the ring above. The penultimate ring is greater in diameter, and stronger than the rest. The last tracheal ring is represented only by the posterior extremities of the

Fig. 30.



Front view.

Fig. 31.



Back view.

*Meleagris gallopavo.*

normal ring, its lateral and anterior parts having quite disappeared, in the half-grown, and perhaps even younger bird. It will be remembered that its lateral elements are much reduced in *Lagopus*. In *Meleagris* the reduction has gone further, the only remainder being the inverted blunt triangular cartilage that intervenes between the juxta-pessular margin of the penultimate ring and the posterior articulation of the first bronchial semiring on each side of the organ. A minute pointed process of the outer margin of the cartilage under consideration indicates the situation of the posterior root of the

lateral portion of the atrophied ring. The first and second bronchial semirings are upturned laterally, and more slender than those below them. The first anteriorly sends upwards and inwards a lengthy process of about three times the thickness of the body of the ring itself, cut away obliquely, so that its upper end looks inwards and a little upwards, nearly to meet its fellow, from which it is separated by a narrow triangular fibro-cartilage, developed at its base from the middle of the antero-inferior margin of the penultimate ring of the trachea. The second semiring is slightly swollen at its ends to articulate with the semiring above. The interval between the penultimate ring and the first semiring is necessarily considerable, and is quadrate as well as slightly biconcave; that between the first and second semiring is meniscoid, convex upwards, and shallow. The bronchial semirings below the second are peculiarly lengthy, especially the fifth, and pointed at the ends. Strangely, also semiring three, a short distance external to its anterior termination, articulates by small special facets with those above and below. The bronchidesmus is particularly strong.

By Temminck<sup>1</sup> this windpipe is imperfectly figured.

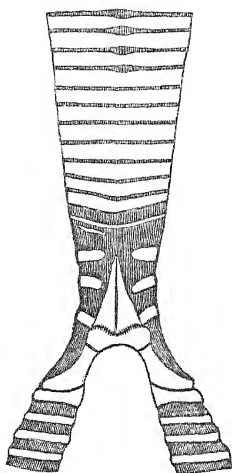
*Gallus bankiva* at first sight seems to have the lower end of its windpipe constructed upon quite a different type from that of any of its allies, although I have reason to believe that other species fill up the gaps between it and other Phasianidæ. The lower extremity of the trachea is very much compressed from side to side, whilst it is correspondingly augmented in depth from before backwards. The antero-posteriorly directed pessulus joins in front the base of a considerable median triangular cartilage, which, with upward-directed small-angled apex, reaches as high as the level of the antepenultimate tracheal ring; posteriorly it joins a similar but smaller cartilage, the apex of which does not quite reach the penultimate ring. With the lateral angles of these triangular cartilages, the anterior and posterior extremities of the first bronchial semirings freely articulate. These semirings are large and much curved, with the convexity directed downwards. Anteriorly they meet, but do not articulate with the scarcely modified second semirings, from which they are quite independent behind.

The last tracheal ring is thin and band-like, joining the lower ends of the sides of the anterior triangular cartilage in front, whilst behind its free extremities are separated by a considerable interval, partly occupied by the posterior triangle. The penultimate ring persists as two straight lateral band-like rudiments fixed in the tracheal membrane, and *nearly* reaching both the anterior and posterior triangular cartilages. The antepenultimate ring is still further modified in the same direction, only the antero-lateral parts persisting as rudiments, not seen, therefore, in the back view of the organ. A short distance above the level of the apex of the anterior triangular cartilage, and some way below the first fairly normal tracheal ring, is a continuous filamentous transverse cartilage, with little extra pieces connected to it—incomplete in the middle line

<sup>1</sup> *Loc. cit.* pl. iii. fig. 8.

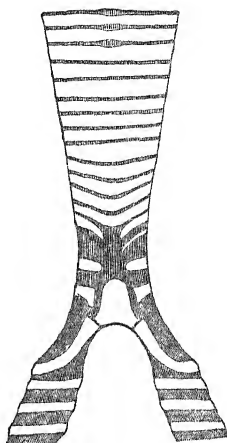
behind, supported by the membranous walls of the windpipe. This is evidently the atrophied fourth ring, counting from below. Above this an abrupt change occurs; the rings attain their ordinary depth, with only linear intervals between them. The fifth ring, again counting upwards, differs from those above it in being slightly incomplete behind, with downturned ends. The interval between it and the fourth is about equal to its own depth. It in front, and its

Fig. 32.



Front view.

Fig. 33.



Back view.

*Gallus bankiva.*

superior two or three neighbours behind as well, is slightly V-shaped in the middle line<sup>1</sup>.

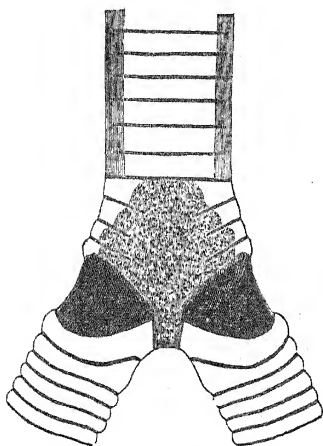
The Cracidae are particularly uniform in the manner in which the trachea bifurcates. In *Mitua tuberosa* there are no tracheal interannular intervals of any kind. The pessulus is united with the penultimate ring posteriorly and with the last ring in front, the latter ring being therefore incomplete behind, as in all the birds above described. Mid-anterior and posterior ossifications extend upwards from the attachments of the pessulus, generally sufficiently high to involve the four lowermost rings, which are therefore consolidated together in the median lines. The lower lateral borders of the last tracheal ring are slightly concave downwards; the medio-anterior descending process being small, whilst by its slightly truncated triangular apex it forms a small portion of the actual margin of the bifurcation. On account of the considerable length of the

<sup>1</sup> By Temminck (*loc. cit.* pl. ii. fig. 4) a different figure of the windpipe of *G. bankiva* is given.



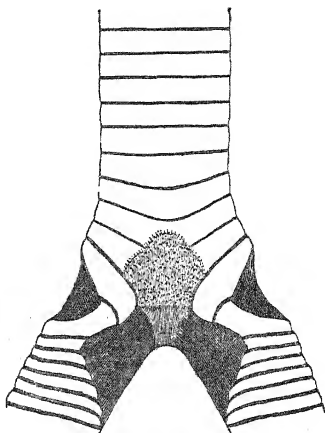
slender first bronchial semiring, which is very concave upwards, the interval between it and the last tracheal ring is conspicuously large and fusiform, one side of the small antero-median process and the outer border of the inferior angle of the corresponding truncated posterior termination of the last tracheal ring being its articulating spots. The semiring is not of uniform thickness, small expansions, not unlike the "tubercles" of ribs, occurring at a short distance from both ends, which mark the points at which the next semiring meets it and ceases. The second semiring is simple, except that it is slightly enlarged at its posterior extremity. The interval between it and its neighbours is extremely narrow.

Fig. 34.



Front view.

Fig. 35.



Back view.

*Aburria carunculata.*

The species I have examined are *Crax globicera*, *C. carunculata*, *Pauvis galeata*, *Mitua tomentosa*, *Penelope jacucaca*, *P. cristata*, *P. superciliaris*, *Pipile cumanensis*, and *Aburria carunculata*. In *Penelope*, *Pipile*, and *Aburria* the first bronchial semirings are thicker and stronger than in *Crax* and its near allies, their posterior articulations with the ends of the last tracheal ring being upon what becomes the outer, but normally would be the inferior surfaces of its juxtapedicular terminations, because of a characteristic downward flexure of their expanded obtuse extremities.

The lateral intrinsic tracheal muscles are thin, and run down to cease opposite the ring fifth from the bifurcation of the tube, as in nearly all Gallinaceous birds. I cannot trace any fibrous continuation to the lower rings from their muscular extremities.

Incidentally it may be mentioned, with reference to the development of the extrathoracic tracheal loop in the Cracidae, that, as far

as my facts go, this loop is found in the males only of the genera *Crax*, *Pauwias*, and *Mitua*; whilst in *Penelope purpurascens*, *P. cristata*, *Pipile*, and *Aburria* it is wanting in both sexes, it being present in both sexes of *Penelope jacucaca*. In the males of *Penelope pileata* and *Ortallida albiventris*<sup>1</sup> it is present; the females I have not seen.

The flattening of the trachea of the male Cracinae, excellently depicted (inverted) in Temminck's figure of the windpipe of *Crax alector*<sup>2</sup>, is lateral or from side to side, so that the well-known anterior and posterior notching of the rings of the trachea is on the thin edges of the flattened tube.

In conclusion, it may be asked what light this detail concerning the bifurcation of the trachea throws on the mutual affinities of the genera of the Gallinæ. It is very infrequently that the study of a single organ justifies the formation of an ultimate classification of any group; and the windpipe of the Gallinæ is not peculiar in this respect. Several hints are to be derived from this investigation, however, not unimportant in my estimation.

*Pavo* seems to stand alone on account of the simplicity of its bronchial bifurcation.

There seems also to be a tendency for the majority of the Gallinæ to fall into two divisions, a Coturnicine and a Phasianine; in the former of which it is the bronchial semirings which are most specialized, at the same time that their anterior extremities are pointed and produced inwards. In the latter group it is the last tracheal ring that is most modified, its sides being always upturned. Upon this assumption it is not easy to place the genera *Gallus*, *Lophophorus*, *Meleagris*, and *Numida*. The others fall into the following order:—

## COTURNICINÆ.

*Caccabis.*  
*Argus.*  
*Polyplectron.*  
*Ithaginis.*  
*Lophortyx.*  
*Oreortyx.*  
*Arboricola.*  
*Rollulus.*  
*Ptilopus.*  
*Coturnix.*

## PHASIANINÆ.

*Euplocamus.*  
*Pucrasia.*  
*Ceriornis.*  
*Phasianus.*  
*Thaumalea.*  
*Crossoptilon.*  
*Lagopus.*  
*Tetrao.*  
*(Meleagris?).*  
*Perdix.*

It is surprising to see how much the lower end of the trachea of the adult *Gallus* differs from that of *Phasianus* and its allies. A study of the development of the windpipe of the Common Fowl—which I have not had the opportunity of undertaking—would probably throw considerable light upon the subject.

<sup>1</sup> Vide Temminck, *loc. cit.* pl. viii. fig. 1.

<sup>2</sup> *Loc. cit.* pl. v. fig. 1.

4. On a new Fish of the Genus *Lycodes* from the Pacific.

By ROBERT COLLETT, C.M.Z.S.

[Received March 25, 1879.]

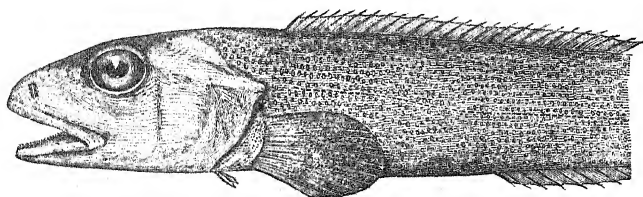
*LYCODES PACIFICUS*, n. sp.

Vomerine and palatine teeth none. Coloration uniform yellowish grey. The body is scaly, the head and the pectorals naked. The head is contained four times and six tenths, the height of the body nine times, in the total length. Lateral line very indistinct.

M.B. 6. D. (circa) 92. A. 71. C. (circa) 1.1. P. 18.

*Hab.* Japan (*Mus. Berol.*).

Body moderately elongated; the height of the body is one half of the length of the head, which is contained four times and six tenths in the total length. The snout is only a trifle longer than the eye, which is one fourth of the length of the head; the upper maxillary



*Lycodes pacificus* (nat. size).

extending to below the anterior part of the eye. Teeth only in the jaws, forming a single row behind; in the upper jaw there is a double series in front, in the lower jaw three or four series. The origin of the dorsal is only a little behind the vertical from the root of the pectorals; it has about 92 rays, which are divided to their bases. The anal has 71 rays, and commences below the vertical from the seventeenth ray of the dorsal. The rays of the caudal are exceedingly close together and slender; their number seems to be 6 on the dorsal, and 5 on the ventral side, as in other species of *Lycodes*. The pectorals are broad and rounded, and have 18 rays; their tips do not reach forwards to the eye. Along the jaw is slightly visible the usual row of shallow impressions, which correspond with the holes in the maxillary bones, as in the *Lycodes* generally. The body and the bases of the dorsal and the anal are scaly; the head, the pectorals, and the ventrals are naked. The distance of the vent from the snout is contained twice and a half in the total length. One

lateral line is visible, but very indistinct; it runs in the median furrow of the body.

The coloration (in the single preserved specimen) is a uniform yellowish grey, without trace of spots or bands. The belly is silky grey, the inside of the mouth black.

*Measurements :—*

	millim.
Total length (to the tip of the caudal) . . . . .	184
Length from the snout to the origin of the dorsal . . . . .	43
Length from the snout to the vent . . . . .	73
Length from the vent to the tip of the caudal . . . . .	111
Length of the head . . . . .	40
Height of the body . . . . .	20
Length of the intermaxillary . . . . .	15
Length of the snout . . . . .	11
Length of the eye . . . . .	10
Length of the postorbital part of the head . . . . .	19
Length of the pectorals . . . . .	20

Through the kindness of Prof. Peters I have been enabled to describe a specimen of this species,  $7\frac{1}{2}$  inches long, which is preserved in the Zoological Museum of Berlin. It was purchased through Mr. Salvin, and was said to have been received from Japan. The absence of vomerine and palatine teeth, a character quite peculiar to the species, will perhaps necessitate its removal to a separate genus, for which I propose the name *Lycodopsis*.

Christiania, March 20, 1879.

5. On the Common Dolphin, *Delphinus delphis*, Linn. By  
WILLIAM HENRY FLOWER, F.R.S., P.Z.S.

It is somewhat remarkable that no really adequate figure of so well known an animal as the Common Dolphin, *Delphinus delphis*, L., is to be found in any zoological publication. The best with which I am acquainted is one given by Reinhardt ("Notits om en paa østkysten of Jylland fanget *Delphinus delphis*," in Naturh. Forenings Vidensk. Meddelelser, Nr. 10 & 11, 1866), from an animal 5 feet 4 inches long taken near Grenaa, on the Jutland shore of the Cattegat, in November 1865. This figure, however, is not coloured, and wants the details of the markings seen in the specimen to be described presently. Perhaps the next best figure, and, indeed, in some respects superior, is that given in the illustrated edition of Cuvier's 'Animal Kingdom,' which is stated to be "d'après une peinture originale de Maréchal faisant partie des vélins du Muséum." The figures in the volume on Cetacea in the 'Naturalist's Library' by Dr. Hamilton and in Bell's 'British Quadrupeds' are apparently founded on this, though in the latter the tail is differently formed, the gradations of colour are badly given in the engraving, and the whole creature has too

thick and clumsy an appearance. Bonnaterre's figure (*Cétologie*, 1789), professes to be original, from an animal nine feet in length, in which case it could not have been *D. delphis*. It is reproduced by Lacépède (*Hist. Nat. des Cétacés*, 1804), with the addition of the conventional fountain from the blowhole. The earlier figures, all more or less inexact in outline, rude in execution, and of course deficient in colour, are those of Belon (1551), Rondelet (1554), and Aldrovandus (1613). The two former, especially that of Rondelet, have been repeated, with modifications, by the various compilers of the last two centuries.

On the 13th of March, Mr. F. Buckland kindly informed me that he had just received from Mr. Matthias Dunn, of Mevagissey, a Dolphin which had been caught in the mackerel-nets, about 20 miles south of the Deadman Headland, Cornwall. It proved to be a young female *Delphinus delphis*. The elegance of the form, and beauty and variety of the colouring was such, that I thought it desirable to obtain a correct coloured drawing of the animal while fresh, a copy of which I propose to publish in the Society's 'Transactions.' Instead of being simply black above and white below as usually described, the sides were shaded, mottled and streaked with various tints of yellow and grey, the distribution of which can be better understood by a reference to the figure than by any description. The colouring on the two sides was exactly alike. The under surface was of the purest possible white. The length of the creature in a straight line from the tip of beak to the notch in the middle of the tail was 5 feet  $1\frac{1}{2}$  inch. The other principal dimensions were as follows:—

	inches.
Tip of beak to anterior end of dorsal fin.....	31·5
Tip of beak to insertion of anterior edge of pectoral fin ..	16·1
Tip of beak to angle of mouth.....	9·0
Angle of mouth to anterior angle of eye.....	1·9
Length of eye-aperture.....	0·8
Posterior angle of eye to external auditory meatus .....	1·5
Length of base of dorsal fin.....	8·7
Height of dorsal fin.....	5·5
Length of anterior margin of pectoral fin .....	10·0
Length of posterior margin of pectoral fin .....	6·9
Breadth of caudal fin .....	13·8

The dental formula was  $\frac{46-44}{48-47}=185$ , which corresponds nearly with that usually observed in the species, some individual variation always met with, even on the different sides of the mouth. There are fifteen pairs of ribs, the last being unattached to its corresponding vertebra, and 21 lumbar and 31 caudal vertebrae.

This species is the Dolphin *par excellence* of the Mediterranean; but its exact geographical range has never yet been defined with precision, owing to the difficulty of distinguishing it from allied species—a difficulty which, it is hoped, the present drawing, when issued, may in some measure help to remove. It is not uncommon in the Atlantic,

on the west coast of France; and it frequently visits the English Channel, pursuing the shoals of mackerel and pilchards. In the Museum of the College of Surgeons is the skeleton of a fine adult animal, which when alive must have been about seven feet long, taken near the beginning of the present century at Worthing. Northwards of this locality it appears to become rare. Van Beneden does not include it among the Cetacea frequenting the Belgian coast, as he was not able to find any example of its capture in the North Sea. Specimens, however, are occasionally met with on the coast of Norway and Denmark, as mentioned by Lilljeborg and Reinhardt; and although it is included in many of the lists of the Cetacea of the Greenland Seas, it is doubtful whether some of the species of *Lagenorhynchus* may not have been mistaken for it.

Mr. Buckland has added a cast of this specimen to his valuable series of models of Cetacea, which exhibit better than any other method yet devised the form, proportions, and colour of these animals, otherwise so difficult of preservation.

May 6, 1879.

Prof. Flower, F.R.S., President, in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the month of April 1879:—

The total number of registered additions to the Society's Menagerie during the month of April 1879 was 110, of which 3 were by birth, 77 by presentation, 3 by purchase, 8 by exchange, and 19 were received on deposit. The total number of departures during the same period by death and removals was 115.

The most noticeable additions during the month of April were as follows:—

1. Two Lanceolated Jays (*Garrulus lanceolatus*, Vigors) from the Himalayas, received in exchange April 1st. This fine bird, a close ally of our well-known Jay, has not, so far as I am aware, been brought to Europe alive previously.

2. Two female Roe-deer (said to have been brought from China, and purchased by one of the Society's correspondents at Marseilles), received in exchange April 3rd. These Deer are probably referable to the *Capreolus pygargus* (Pallas), and differ from the European species in having a longer body and head, and being higher on the legs. The colour is much darker, and appears to be red in the summer coat. The ears are longer and more pointed.

3. A fine young male of the Japanese Goat-Antelope (*Capricornus crispus*<sup>1</sup>) presented by the Society's Corresponding Member, Mr. H. Pryer, of Yokohama, Japan, and received April 12th.

We owe Mr. Pryer many thanks for the trouble he has taken in obtaining for us this fine and rare animal, the first of its species which has ever reached us.

4. An Alpine Accentor (*Accentor alpinus*) received in exchange April 30th, being, it is believed, the first example of this little bird obtained in captivity.

<sup>1</sup> *Antelope crispia*, Siebold, Faun. Japon. Mamm. p. 55, tab. xvii.

I have also to report that our Superintendent has had the four Indian Elephants carefully weighed, and that their sizes and weights are as follows:—

	Height at shoulder.		Circumference of the front foot above the toes.		Weight.			
	ft.	in.	ft.	in.	tons.	cwt.	qrs.	lb.
Jung Pacha..	7	0	3	8	2	3	0	23
Suffa Culli ..	6	10	3	8	2	2	3	11
Rustom ....	6	0	2	11	1	3	3	26
Omar .....	6	2	3	2	1	7	1	5

I propose to record these weights and dimensions in the Society's 'Proceedings' for future reference.

The following letter, addressed to the Secretary by Mr. E. L. Layard, F.Z.S., dated from Noumea, 29th January, 1879, was read:—

"SIR,—While giving my friend Mr. D. G. Elliot all the credit due to him for the vast amount of research and labour bestowed on his elaborate paper on the genus '*Ptilopus*' (P. Z. S. 1878, p. 500), which has just reached me, and thanking him for the kindly and honorable way in which he has referred to my poor labours in the field of ornithology, permit me to protest as loudly as I can against my name being given as guarantee for very false information.

"As you, Sir, well know, my wandering life has cut me off from well-filled museums, specimens, and books. I therefore do not presume to offer an opinion on the classification or identification of any species. But I do profess, as a collecting naturalist, to describe correctly the habits and geographical distribution of the species which I meet with.

"Now Mr. Elliot gives my authority, amongst others, for 'Tongatabou' and 'Fiji' as being the habitats of *Ptilopus purpuratus*, and for the 'Navigators' and 'Friendly' Islands as being the habitats of his *Pt. pictiventris*. Surely Mr. Elliot has strangely overlooked what I wrote, P. Z. S. 1876, pp. 495 & 502; also P. Z. S. 1877, p. 464!!

"I know not who procured the specimens examined by Mr. Elliot, and whether their habitats are to be trusted; but this I affirm, that of these green *Ptilopi* with magenta-coloured heads I never procured but one species on each group of islands, and I doubt if any one else ever did; I will undertake to pick out the Fijian, the Tongan, and the Samoan birds among a thousand. I suppose Mr. Elliot unites the Tongan and Fijian races as one; I am convinced they are distinct. I have sent, either to you or to the 'Ibis,' a paper on this subject, pointing out the distinctions. Where the paper has got to I don't know; it has apparently shared the fate of some others and been lost sight of; but surely what I have written (*l.s.c.*) might have prevented Mr. Elliot from giving me as a guarantee for the propagation of what I consider an error."

Prof. Flower exhibited a coloured drawing of *Delphinus tursio*, Fabr., taken from a nearly full-grown male animal which had been caught at Holyhead on the 5th of October, 1868. Its length was 9 feet 6 inches. The drawing, with a description of the animal, will appear in the 'Transactions' of the Society.

A communication was read from Mr. Gerard Krefft, C.M.Z.S., containing a description and figure of a Bat, of which a specimen had lately been obtained in Queensland, and which Mr. Krefft was inclined to refer to a new genus and species of the family Phyllostomatidae. It was pointed out by Mr. Alston that the Bat in question was probably more correctly referable to the genus *Megaderma*; but was of great interest, as no species of that genus had yet been recorded as found in Australia.

The following papers were read:—

1. Description of a new Species of Woodpecker from the Island of Tzus Sima, near Japan. By Rev. H. B. TRISTRAM, F.R.S.

[Received March 20, 1879.]

(Plate XXXI.)

I have lately had placed in my hands for examination, through the kindness of Vice-Admiral Sir Geo. Henry Richards, K.C.B., F.R.S., a small but very interesting collection of birds, made by his son, Lieut. Richards, R.N., in the Japanese seas, among which are some half-dozen species from the island of Tzus Sima, very seldom visited, and situated midway between Japan and the Corea. All belong to well-known Japanese forms, excepting one, which appears to me to be undescribed, and which I venture to name in honour of its discoverer

*DRYOCOPUS RICHARDSI*, sp. nov. (Plate XXXI.)

*Dr. niger, pene resplendens; imo pectore, abdominis lateribus tergoque albis, crisso nigro, gula cinereo-nigra; remigibus sex prioribus ad apices albis; subalaribus et pogonio interno rectricum et tectricum superiorum ad basin albis per duos digitos longitudinis, tectricibus caudæ superioribus et inferioribus albo marginatis: long. tot. 19, alæ 9.6, caud. 8, rostr. a rictu 2.5, lat. ad basin .75, tarsi 1.25, digit. med. cum ungue 1.8.*

This species is very nearly allied to *Thriponax hodgsoni* (Jerd.) and *T. crawfordi*, G. R. Gr., the former from Malabar, the latter from Pegu. But no species of this genus has yet been observed in the vast intermediate region, although Mr. Swinhoe procured *Dryocopus martius* at Pekin. I cannot find any record of any large Woodpecker being found in Japan, though we may feel certain that



this species, occurring so near as Tzus Sima, must also inhabit at least the southern island. Our new species is larger than any of its congeners. The female, which unfortunately alone we possess, is rather larger than the male of *Thriponax hodgsoni* of Southern India, from which species it may at once be distinguished by the extent of white on the back and breast being nearly double in extent, by the white tips to the quill-feathers, the white axillaries and under wing-coverts, and the white on the inner webs of the primaries and quill-feathers. From *T. crawfordi* it is at once distinguished by its much larger size, exceeding that of the former by 4 inches in length, and the wing being  $1\frac{1}{2}$  inch longer, while the bill, which is  $\frac{1}{2}$  inch longer, is much more massive, and the tarsus shorter.

Though the type is a female, there can be no doubt, from its correspondence with the females of the other species, that the male when obtained will be found to have the same sexual distinction of red on the head possessed by its congeners.

## 2. Descriptions of new Genera and Species of Asiatic Lepidoptera Heterocera. By F. MOORE, F.Z.S. &c.

[Received April 2, 1879.]

(Plates XXXII.-XXXIV.)

### SPHINGES.

#### MACROGLOSSA TAXICOLOR, n. sp.

*Fore wing* grey-brown, with two transverse median ferruginous-brown bands, the inner band narrowest at the costal end, the outer band angled on its external border and broadest at the costal end; a distinct black spot below the apex: *hind wing* pale ochreous-red, with dark ferruginous-brown base and outer band. Body ferruginous-brown, with pale ochreous lateral spots; anal tuft black, slightly tipped with ferruginous. Underside ferruginous, with brown outer border and indistinct transverse narrow discal lines.

Expanse  $1\frac{3}{4}$  to 2 inches.

*Hab.* Ceylon. In coll. F. M. Mackwood and F. Moore.

### CLANIS, Hübner.

*Clanis*, Hübn. Verz. bek. Schmett. p. 138.

*Basiana*, Walk. Catal. Lep. Het. B. M. viii. p. 236.

#### CLANIS UNDULOSA, n. sp.

*Male.* Upperside cinnamon-brown. *Fore wing* washed with purple along posterior border; with seven transverse dusky brown lunular bands, the third bent inward to the costa and very broadly suffused across lower end of the cell; fourth and fifth composed of broader

lunules, which are confluent between the veins and interrupted between the upper median branch and the radial; the seventh with a dark triangular grey-speckled patch at apical end; an oblique fascia formed across the wing by the bent end of the fourth band and the outer parallel lunules: *hind wing* densely black at the base, and black-speckled on the disk, with a distinct transverse narrow sinuous band; abdominal border pale ochreous. Abdomen paler cinnamon colour. Thorax and top of head with a longitudinal dusky streak; front of head black; shaft of antennæ pink. Legs pink; tibiæ black at sides; hind tibiæ with a white streak above; spurs white. Underside paler-coloured, with three or four median transverse indistinct dusky sinuous bands: *fore wing* with a broad black streak from base below the cell, and a narrow oblique apical line.

Expanse  $4\frac{1}{4}$  inches.

*Hab.* N. China. In coll. Dr. Staudinger.

Nearest allied to *C. bilineata* (*Basiana bilineata*, Walk.), from N.E. Bengal, from which it differs above in being of an entirely different colour and markings.

#### AMBULYX AURIPENNIS, n. sp.

*Male.* Upperside—*fore wing* golden-brown, palest at the base and greenish-tinted externally; a small pale-bordered dark sap-brown spot at the base, and a larger spot below the cell; a pale sap-brown narrow band recurving from apex to posterior angle; four equidistant short, oblique, indistinct costal streaks, and two less distinct transverse discal sinuous lines: *hind wing* dark ochreous, anterior border yellowish, crossed by three short blackish sinuous fasciæ, the base of wing also blackish. Body ochreous-brown, pink-tinted; a frontal band, broad lateral band on thorax, and a narrow dorsal line sap-brown. Palpi, pectus, and anal segments beneath ferruginous. Underside yellowish ferruginous; disk brown-speckled; a grey marginal band on fore wing.

Expanse 3 inches.

*Hab.* Ceylon (*Sir W. H. Gregory*). In coll. Dublin Museum.

Nearest allied to *A. rhodoptera*, Butler, from Darjiling.

#### TRIPTOGON RECTILINEA, n. sp.

*Male.* Nearest allied to *T. fuscescens*, Butler, Trans. Z. S. ix. p. 587, pl. 93. f. 2, but of smaller size. *Fore wing* deeper-coloured, the transverse lines blacker, there being four in the subbasal series, which are erect and not curved outwards; the discal pair are both angled at the middle; and the outer pair are close together and parallel throughout their length: *hind wing* of a brighter chestnut colour, with a smaller greyish anal area, and with a continuous dark streak; middle of thorax and a posterior band dark chestnut.

Expanse  $2\frac{5}{8}$  inches.

*Hab.* N. India. In coll. Dublin Museum.

## BOMBYCES.

## Fam. AGARISTIDÆ.

SEUDYRA, Stretch, Cistula Entom. ii. p. 19 (1875).

## SEUDYRA VENOSA, n. sp.

Upperside—*fore wing* with the apex and broad band on hind margin dark chestnut-brown, suffused with lilac and crossed by sinuous white lines; intermediate space from the base greyish white speckled with black, the veins being prominently whitish; a transverse, sub-basal, curved greyish line and a tortuous discal double line, enclosing a pale-bordered, oval, orbicular and large reniform spot, both the lines terminating near together on middle of hind margin: *hind wing* golden yellow, with a broad black marginal band, which is broken at anal angle. Cilia grey. Thorax chestnut-brown, grey-speckled; abdomen and legs golden yellow, with a short basal dorsal brown tuft.

Underside—*fore wing* with the basal third yellow, the outer portion black, and enclosing a small white quadrate spot before end of the cell, and a large, broad, oblique discal spot beyond: *hind wing* yellow, with broad outer black band and a terminal anal spot: a marginal row of white dentate marks on both wings.

Exp.  $1\frac{1}{8}$  to  $2\frac{2}{8}$  inches.*Hab.* Darjiling (*Russell*). In coll. F. Moore.

## Fam. ZYGENIDÆ.

## ZYGENA ASOKA, n. sp.

*Fore wing* blackish green, with five orange-yellow spots, the first subbasal, the second and third costal, each at one third its length, the fourth below the cell, the fifth subapical and crossed by two black veins: *hind wing* jet-black, with two large crimson-red spaces, one being basal, the other apical and longitudinally black-streaked. Antennæ steel-blue. Head, thorax, and body jet-black. An orange-yellow spot on each side of front of thorax. Second and third anal segment crimson-red. Legs black.

Exp.  $1\frac{1}{8}$  inch.*Hab.* N.W. India. In coll. late C. Horne, Esq.

## SYNTOMIS AUSTENI, n. sp.

Yellowish hyaline. Veins prominently black: *fore wing* with narrow black marginal band, streak along lower median veinlet, and band between upper median and lower subcostal veinlets: *hind wing* with marginal black band dentated below lower median veinlet; anal margin yellow. Body jet-black, middle and sides of thorax and broad band on each segment of abdomen orange-red, tip being black. Legs brownish black.

Exp.  $1\frac{3}{8}$  inch.*Hab.* Surarium, N.E. Bengal (*Godwin-Austen*). In coll. F. Moore.

—*DYSAUXES INDICA*, n. sp.

*Female*. Upperside chocolate-brown: *fore wing* with two yellow median spots, the upper round, lower conical and on hind margin: *hind wing* with the basal half yellow. Front of head, tegulae, and tip of abdomen yellow. Spots on underside of fore wing less defined. Legs brown.

Exp.  $1\frac{1}{2}$  inch.

*Hab.* Bombay (*Dr. Leith*). In coll. F. Moore.

Larger than *D. punctata* of Europe, and distinguished by having only two yellow spots on fore wing.

—*ARTONA QUADRIMACULATA*, n. sp.

*Male and Female*. Brown; cilia whitish: *fore wing* with a small oval subapical yellow spot: *hind wing* with a short, curved, clavate, median, transverse yellow streak. Palpi and legs greyish brown.

Exp.  $\frac{7}{8}$  inch.

*Hab.* Masuri, N.W. Himalayas. In coll. Major Lang and F. Moore.

## Fam. CHALCOSIIDÆ.

*ARACHOTIA*<sup>1</sup>, Moore, *Asiat. Soc. Beng., Desc. Lep. Atk. Coll.* p. 14 (1878).

—*ARACHOTIA VESPOIDES*, n. sp.

*Female*. Wings transparent, yellowish: *fore wing* with the costa and hind margin, subcostal and median veins, a discocellular streak, and outer marginal band black: *hind wing* with the costal margin white; narrow outer marginal band black; outer marginal band on both wings dentated near posterior angle. Antennæ black. Vertex and thorax black; collar and band across thorax yellow. Front of head grey. Abdomen yellow above, greyish beneath, with black narrow bands and broad tip. Palpi yellow, black-tipped. Legs black, streaked with grey beneath.

Exp.  $1\frac{1}{2}$  inch.

*Hab.* N. India. In coll. F. Moore.

*CHALCOSIA ALBATA*, n. sp.

Similar to *C. idæoides*, H.-S. *Lep. Spec. Nov.* pl. 1. f. 6, from Java. Differs in having the oblique bands and hind wing pure white above and beneath, the discal band on fore wing being broader and of uniform width throughout, and the marginal black band on hind wing narrower. Collar above with two metallic-blue raised spots; palpi and legs white.

Expanse 2 to  $2\frac{2}{3}$  inches.

*Hab.* Dharmasala, N.W. Himalaya; Nepal. In coll. F. Moore.

*CHALCOSIA BICOLOR*, n. sp.

*Female*. Upperside pale greenish yellow: *fore wing* with a broad, even-margined, dark cupreous-brown submarginal band: *hind wing*

This genus is allied to *Trypanophora*.

with an inner-angled black apical band. Base of costal border, upper part of thorax, head, and antennæ steel-blue; front of head and palpi white. Legs yellowish, slightly steel-blue above. Underside as above; band on fore wing with a geminated white spot below the apex, the apex of both bands steel-blue.

Expanse  $1\frac{6}{12}$  inch.

*Hab.* Sumatra (*Buxton*); Malacca (*Eichhorn*). In coll. F. Moore and Dr. Staudinger.

—CHELURA BASIFLAVA, n. sp.

*Male.* Upperside pale livid white; *fore wing* with a short basal costal ochreous streak, three basal transverse dark fuliginous bands, the outer portion of the wing being paler fuliginous, leaving only a short, pale livid-white streak between the veins: *hind wing* with the subcostal and median branches bordered with fuliginous, leaving only a pale livid white elongated streak between the veins. Head, antennæ, hind part of thorax, and abdomen fuliginous black; collar and fore part of thorax and tip of abdomen ochreous. Legs fuliginous black.

Expanse  $2\frac{3}{8}$  inches.

*Hab.* Darjeeling. In coll. F. Moore.

Smaller than *C. bifasciata*, Hope. Differs in the absence of the two ochreous transverse subbasal bands, these being entirely black, instead of ochreous with black borders, and in the veins being very much more broadly bordered with fuliginous.

AGALOPE LIVIDA, n. sp.

*Female.* Upperside dull opaque bluish white; veins dark brown; *fore wing* with a basal orange-yellow patch; area within the base of the cell in fore wing and apex of both wings fuliginous. Body, antennæ, and legs black; fore legs above greyish.

Expanse  $2\frac{3}{8}$  inches.

*Hab.* China. In coll. Dr. Standinger.

Differs from *A. basalis*, Walker, from the N.W. Himalayas, on the fore wing in the absence of the median transverse fuliginous band, and in the hind wing having the veins dark and the apex fuliginous.

—BORADIA, n. g.

*Male and Female.* *Fore wing* elongated oval; costal vein extending to two thirds its length; subcostal vein three-branched, first branch arising before end of the cell, second from end of the cell, bifid; discocellulars bent inward at the middle, upper bent outward near subcostal end; radial from angle of upper discocellular, and a discoidal veinlet emitted within the cell; median vein four-branched, the branches straight, two upper branches on a foot-stalk from end of the cell; a submedian and an internal vein: *hind wing* elongated, trigonal; costal vein extending to apex; subcostal vein two-branched, first branch very short, and joined to costal before end of the cell, second from end of the cell; discocellulars, radial, and discoidal veins as in fore wing; median vein four-branched, the two upper

from end of cell, but separated at base; a submedian and two internal veins. Body short; antennæ bipectinate in male, slightly serrate in female; thorax slightly pilose; abdomen and legs nearly naked.

Allied to *Agalope*, Walker.

*BORADIA CARNEOLA*, n. sp.

*Male and Female* subhyaline, pale flesh-colour, yellowish at base of fore wing. Abdomen black; thorax and head above yellowish; antennæ and legs black; tarsi tawny.

Expanse  $1\frac{1}{4}$  inch.

*Hab.* Dharmasala, N.W. Himalaya (*Rev. H. Hocking*). In coll. Lord Walsingham and F. Moore.

*CYCLOSIA SUBFLAVA*, n. sp.

*Male.* Upperside pale dull buff-yellow: *fore wing* with the veins blue-lined basally, and broadly with black externally, their outer ends forming a narrow marginal band, the interspaces on the disk minutely black-speckled: *hind wing* with the veins at the extreme base and externally blue-lined, outer marginal band narrow, black apically, blue posteriorly. Thorax, head above, and antennæ steel-blue; abdomen green; front of head and palpi white, the latter blue at sides. Legs blue above, white beneath. Underside blacker-veined than above; basal area of hind wing bright yellow.

Expanse 2 inches.

*Hab.* Malacca (*Eichhorn*). In coll. Dr. Staudinger.

Distinguished from *C. papilionaria* by the absence of the marginal row of spots on both wings, and in the basal area of the hind wing being bright yellow beneath.

*CANERKES SEMIPLENA*.

*Euschema semiplena*, Walker, Catal. Lep. Het. B. M. p. 177 (1864), ♀.

*Hab.* Malacca. In coll. F. Moore (ex coll. Norris).

—*RATARDA*, n. g.

*Male and Female.* Wings obovate. *Fore wing* short, costa slightly arched, apex and exterior margin very convex, posterior margin short; costal vein short; subcostal vein four-branched, first branch starting at half length of the cell, second trifurcate, the upper fork at half its length, second fork near apex; cell short, oblique; discocellulars very oblique, bent in the middle, each slightly curved; a discoidal veinlet emitted from angle of discocellulars, continuous with the radial and extending to base of the cell; radial from middle of the discocellulars; median vein four-branched, the two upper from angles at end of the cell; a submedian and an internal vein. *Hind wing* of the same length as fore wing, convex externally; costal vein short; cell broad, short, oblique; upper discocellular short, lower very oblique; subcostal two-branched, first before end of cell; a

straight discoidal veinlet from middle angle of discocellulars to base of cell; median four-branched, two upper from angles at end of the cell; a submedian and two internal veins. Body short, sparsely pilose. Legs short, sparsely pilose. Legs short, slender, nearly naked. Palpi minute, pilose. Antennæ bipectinated.

*RATARDA MARMORATA*, n. sp. (Plate XXXII. fig. 1.)

*Male*. Upperside—*fore wing* blackish fuliginous, with a white irregular space within the cell, large circular-shaped spots below it, and very indistinct speckled spots beyond: *hind wing* blackish fuliginous on external half, the base white; outer half slightly white-speckled. Underside similar to above, the white on fore wing more diffused, and the hind wing more prominently white-speckled. Female blacker than male. Body blackish fuliginous. Legs yellowish.

Expanse ♂  $1\frac{6}{8}$ , ♀  $1\frac{9}{10}$  inch.

*Hab.* Darjiling. In coll. F. Moore and British Museum.

—*KLABOANA*, n. g.

*Female*. *Fore wing* elongated; costa slightly arched at base, apex somewhat pointed, exterior margin nearly straight; first branch of subcostal vein short, oblique, and anastomosed to costal, second before end of the cell, free, third trifurcate, upper starting at nearly half length beyond the cell, the two lower on a foot-stalk near junction with upper; radial starting from below subcostal at beyond half distance between end of the cell and third branch; cell broad at its end; discocellulars bent very obliquely inward, upper shortest; a discoidal upper veinlet emitted within the cell from middle of discocellulars and extending to its end, a lower shorter discoidal veinlet from lower end of discocellulars and joining the upper one at one third its length; median vein four-branched, two upper branches from point at lower end of the cell; a submedian and internal vein. *Hind wing* broad, apex and exterior margin convex, abdominal margin as long as the body; cell broad; subcostal vein angled upward at first branch and oblique beyond, first branch very short and anastomosed to costal, second from end of cell; discocellulars contiguous and bent inward, upper angled near subcostal; radial starting from angle of upper discocellular; median four-branched, each branch from nearly equidistant angles, upper curved and close to radial; a submedian and two internal veins. Body slender; abdomen with an anal radiated tuft of short fine hairs. Antennæ bipectinate. Palpi small. Legs long, squamous; middle and hind legs armed only with a very small terminal pair of spurs.

*KLABOANA MACULARIA*.

*Gynautocera macularia*, Guér. Deless. Voy. p. 83, pl. 25. fig. 2.

*Hab.* Malacca.

THYMARA, Doubleday, Zoologist, i. p. 197.

—THYMARA CAUDATA, n. sp. (Plate XXXII. fig. 3.)

*Male.* Fore wing dark fuliginous, veins black; the space within the cell and immediately below it to the base ochreous: hind wing golden yellow, with a large median costal spot, a smaller subanal spot, and the entire elongated tail and its fringe black. Body golden yellow; thorax and anal tuft black. Front of head and legs golden yellow.

Expanse: fore wing  $1\frac{1}{8}$  inch; hind wing, including tail,  $1\frac{9}{10}$  inch.

*Hab.* British Burmah. In coll. F. Moore.

This species has also been taken at Punkabari, in Assam, by Mr. W. B. Farr, who has a fine specimen in his collection from that locality.

Fam. NYCTEMERIDÆ.

—NYCTEMERA NIGROVENOSA, n. sp.

Allied to *N. coleta*, Cram. (Exot. Lep. pl. 368. f. II), from Java. Differs on the fore wing in the discal maculated band being somewhat narrower, and on the hind wing in the veins being lined with black throughout both above and beneath.

Expanse  $1\frac{3}{4}$  inch.

*Hab.* Ceylon. In coll. F. Moore.

Fam. LITHOSIIDÆ.

—COSSA NUBECULA, n. sp.

*Male.* Pale greyish ochreous: fore wing with a black short triangular streak on the costa beyond the middle; a brown-speckled indistinct patch from before the apex and along the exterior margin: hind wing with a very indistinct darker marginal fascia. Under-side—fore wing dusky brown. Legs dusky brown above.

Expanse  $1\frac{1}{12}$  inch.

*Hab.* Andamans (Port Blair). In coll. F. Moore.

—BARSINE PRETIOSA, n. sp.

Allied to *B. gratiosa*, Guér. Deless. Voy. pl. 26. f. 1, from S. India. Differs above in being greyish ochreous, the fore wing having five transverse series of red spots, which are smaller, the two outer series linear, but disconnected.

Expanse ♂  $1\frac{3}{8}$  inch.

*Hab.* Dharmasala, N.W. Himalaya (Rev. H. Hocking). In coll. Lord Walsingham.

—SETINA DHARMA, n. sp.

Ochreous-yellow; fore wing with a small black basal spot, a transverse interrupted series of four spots, a spot at end of the cell, and a recurved discal series of spots, the latter slightly elongated. Thorax with two small black spots on anterior part; legs above black-streaked.

Expanse  $\frac{9}{16}$  to 1 inch.

*Hab.* Dharmasala, N.W. Himalaya (Rev. H. Hocking). In coll. Lord Walsingham.



## Fam. ARCTIIDÆ.

## - GONERDA, n. g.

*Male.* *Fore wing* long, costa nearly straight, apex acute, exterior margin slightly oblique, hind margin straight to near end; costal vein extending two thirds its length; subcostal vein four-branched, first and second branches arising before end of the cell, fourth and fifth short, the fifth arising from below the third at half its length, fourth from below end of the third; discocellulars slightly oblique, upper very short; one radial starting from angle at upper end of the cell; median vein four-branched, the three upper contiguous at lower end of the cell; submedian curved and extending near the hind margin. *Hind wing* broad, costal margin nearly straight, apex rather acute, outer margin convex; subcostal extending to near apex, three-branched; discocellulars oblique; median vein as in fore wing; submedian nearly straight. Body stout, densely pilose, hairs long and lax on the thorax, anal tuft prominent and divergent; antennæ bipectinated. Palpi decumbent, densely pilose, third joint long. Legs pilose beneath, spurred.

Near to genus *Alope*, Walker.

## - GONERDA PERORNATA, n. sp. (Plate XXXII. fig. 2.)

*Male.* *Fore wing* yellow, crossed by four narrow black irregular bands and two series of basal streaks, the outer or marginal band extending slightly upward beyond posterior angle, the second band being short, third band recurved, fourth bent inward near end of the cell; a black oblique spot at end of the cell; the basal streaks short, irregular, and broken by the veins: *hind wing* deep crimson, crossed by three broad, irregular curved black bands and a narrow marginal line. Cilia of both wings yellow. Thorax ochreous-yellow, with three longitudinal black bands. Abdomen crimson, with black dorsal band and fringe to tuft. Underside as above, the markings on fore wing slightly confluent. Palpi, head, and body beneath black; femora above crimson. Antennæ brown, shaft yellowish.

Expanse 2 inches.

*Hab.* Cashmere. In coll. F. Moore.

## - ARCTIA SUTTADRA, n. sp.

*Female.* Upperside—*fore wing* with three oblique transverse brownish-black broad bands, the interspaces creamy white; first band basal, second median and bifid on the costa, third apical partly divided; cilia black. *Hind wing* crimson, with two large, irregular, oval, submarginal black spots, also a very small spot below the cell; cilia alternate black and yellow. Palpi, head, thorax, and body black; abdomen only with lateral crimson bands. Underside with the median and apical bands as above, the basal absent, interspaces yellow: *hind wing* as above, but no spot below the cell; a narrow streak at end of cell. Abdominal rings fringed with red; legs black, front and mid legs streaked with red, hind tarsi yellowish. Antennæ black.

Expanse  $1\frac{1}{4}$  inch.

*Hab.* Cashmere (Stakpila Pass), 12,000 feet. In coll. Capt. H. B. Hellard.

PANGORA, Moore, Asiat. Soc. Beng., Desc. Lep. Atk. Coll.  
p. 42 (1878).

PANGORA MATHERANA, n. sp.

*Male and Female.* Upperside—*fore wing* olive-brown, with a cream-white broad irregular patch at base, a median transverse distorted band, and large upper and lower outer marginal spots, the basal patch with two small lower black spots and a streak beneath them: *hind wing* ochrey-yellow, with a brown narrow transverse median band, and a broad outer band enclosing upper and lower marginal yellow spots; the outer band broken in the male. Top of head and thorax white, black-spotted, and with a streak down middle of thorax. Abdomen ochrey-yellow, with dorsal and lateral row of black spots. Body beneath and legs brown; femora above yellow. Palpi yellow, tip black. Antennæ brown, basal joint yellow. Underside marked as above, the basal and median spaces on fore wing being also yellow. Near to *P. erosa*, Walk.

Expanse, ♂  $1\frac{2}{3}$ , ♀  $2\frac{2}{3}$  inches.

*Hab.* Matheran Hill, Bombay (*Dr. Leith*). In coll. F. Moore and British Museum.

RAJENDRA, Moore, Asiat. Soc. Beng., Desc. Lep. Atk. Coll.  
p. 43 (1878).

Form and neururation similar to *Cretonotus*, but differs in the hind wing being shorter, less produced at the apex, and the greater convexity of the hind margin. Palpi prominent; antennæ minutely bipectinate in male, simple in female.

Type *R. lativitta*, Moore, *l. c.* p. 43.

This genus will embrace *Aloa sipahi* and *A. nigricans*, Moore, and also several other small species of Tiger-moths described by Mr. Walker under *Aloa*, but which are not congeneric with the type of that genus, these being characterized chiefly by having a longitudinal pale band on the fore wing; they are *A. integra*, *dentata*, *biguttata*.

RAJENDRA VITTATA, n. sp. (Plate XXXII. fig. 12.)

*Male.* *Fore wing* brownish black, with a broad, longitudinal, curved, pinkish white band from base to apex: *hind wing* pale pink, with a blackish streak at base of anterior margin, a spot at end of the cell, another spot at anal angle, and two very indistinct grey-speckled submarginal spots. Cilia of both wings white. Middle of thorax black; tegulæ and sides of head pink-white, a black spot on each tegula. Abdomen bright red above, beneath and dorsal bands black. Antennæ greyish. Front of head and palpi black. Legs black, femora red. Underside of wings as above.

Expanse  $1\frac{5}{8}$  inch.

*Hab.* British Burmah. In coll. F. Moore.

Differs from *R. biguttata*, Walker, in the cilia being white instead of black on both wings, and in the hind wing being very differently spotted.

*RAJENDRA PANNOSA*, n. sp. (Plate XXXII. fig. 8.)

*Male and Female.* Upperside—*fore wing* dark olive-brown, with a broad ochrey-white, lower, longitudinal, irregular sinuous-bordered band from base to below the apex; below the band in some specimens are a few very small contiguous or partly confluent spots; a linear series of three small spots before the apex, and a contiguous costal dentate spot: *hind wing* ochrey-red, with two small brown costal spots, an indistinct spot at end of the cell, a larger spot (broken in the male) before the apex, and one or two small spots near anal angle. Top of head, front and sides of thorax ochrey-white, slightly fringed with ochrey-red, black-spotted, the middle of thorax and a streak on side of tegula brown. Abdomen ochrey-red, with small dorsal and lateral black spots. Antennæ black, with broad white band near tip; basal joint ochrey-red. Palpi ochrey-red, tip black. Front of head black. Body beneath ochrey-yellow; legs black, streaked below with ochrey-yellow; femora above red. Underside of wings as above.

Expanse, ♂  $1\frac{4}{8}$ , ♀  $1\frac{6}{8}$  inch.

*Hab.* Dharmasala (N.W. Himalaya). In coll. F. Moore.

*-HYPERCOMPA FLAVICOLOR*, n. sp.

*Male and Female.* Near to *H. equitalis*, Köllar, but of smaller size, the markings on fore wing and the colour of the hind wing ochrey-yellow. On the *fore wing* the upper spot at end of the cell is the longest, and has two contiguous spots at its upper end before the apex; the spots above the submedian vein are equidistant, and are entirely or partly formed into three, the outer spot being at a distance from the posterior angle; along the hind margin is a very narrow wavy yellow band; other spots similar to *H. equitalis*: *hind wing* with black narrow line on veins, a broad irregular spot at end of the cell, and four angle-bordered submarginal spots, the upper one on anterior margin before the apex, a narrow streak on middle of outer margin; cilia of hind wing yellow, except at the marginal streak, where it is black. Palpi black only on terminal joint; vertex without spots. Legs buff-white, streaked and banded with brown. Abdomen with a dorsal row of small black spots.

Expanse  $2\frac{2}{8}$  to  $2\frac{4}{8}$  inches.

*Hab.* Simla, N.W. Himalaya. In coll. F. Moore.

*-HYPERCOMPA SIMILIS*, n. sp.

Form and pattern of *H. equitalis*. *Fore wing* darker green; spots of a clear ochrey-yellow; costal spots small; the series beyond end of the cell composed of six in a curve, the lowest spot small and placed below the cell, seven spots in the series between the lower median and submedian veins; the outer marginal series small:

*hind wing* yellowish white, veins and two median transverse partially-interrupted bands, and cilia fuliginous. Legs blackish above, ochraceous beneath.

Expanse 2 inches.

*Hab.* Dharmasala, N.W. Himalaya. In coll. F. Moore.

RHYPARIA TIGRINA, n. sp. (Plate XXXII. fig. 4.)

*Male.* Upperside yellowish ochraceous: *fore wing* with broad black streak along basal end of each vein, and two transverse confluent series of outer spots: *hind wing* with black costal border, a suffused spot at end of the cell, and a broad, irregular-bordered submarginal band. A black central spot on thorax, dorsal bands and lateral spots on abdomen. Underside as above. Antennæ, side of head, and palpi black. Legs black, femora ochreous.

Expanse  $1\frac{1}{2}$  inch.

*Hab.* Pulney Hills, S. India (*Sealy*). In coll. India Museum and F. Moore.

Somewhat allied to *R. strigatula* (*Arctia strigatula*, Walker), from Java, but of different colour and markings.

—CYCNIA TRANSVERSA, n. sp.

Upperside pale purplish testaceous: *fore wing* crossed by six black equidistant, irregular, interrupted bands and a marginal row of spots, the bands bent inward and broadest at the costal end: *hind wing* with a black spot at end of the cell, and an interrupted submarginal series. Underside paler; marked as above. Body black-spotted.

Expanse  $1\frac{1}{2}$  inch.

*Hab.* N.W. India. In coll. F. Moore.

—CHALLA, n. g.

*Male and Female.* *Fore wing* elongate, narrow, costa slightly arched towards end, apex nearly convex, exterior margin oblique; subcostal vein five-branched, first branch starting immediately before end of the cell; second from end of cell, quadrifid, the three upper forks short, lowest from below junction of first fork; radial from upper end of the cell; discocellulars of equal length, bent inward; a very slender discoidal veinlet emitted within the cell; median vein four-branched, two upper branches joined together at their base, and starting from end of the cell, third contiguous; submedian vein near the posterior margin. *Hind wing* obovate, subcostal touching the costal at its base, two-branched from end of the cell; upper discocellular shortest, lower very obliquely outward; a discoidal veinlet emitted within the cell; median four-branched, the three upper starting from end of the cell; a submedian and two interior veins. Body short, laxly pilose; antennæ bipectinate in male, minutely serrate-pectinate in female; palpi short, minute; femora and tibiæ slightly pilose.

Allied to *Alpenus*, Walker.

—CHALLA BIMACULATA, n. sp.

*Male and Female.* Ochreous-yellow, deepest on fore wing and

abdomen; fore wing with a small black spot at upper end of the cell; fore legs above lined with black, middle tibiæ at their end and middle and hind tarsi black-streaked; abdomen with an indistinct series of small black dorsal and lateral spots; palpi black, streaked above; pectinations of antennæ blackish.

Expanse, ♂ 1, ♀  $1\frac{1}{4}$  inch.

*Hab.* Dharmasala, N.W. Himalaya (*Rev. H. Hocking*). In coll. Lord Walsingham and F. Moore.

CHALLA DISCALIS, n. sp. (Plate XXXII. fig. 7.)

*Male.* Pale ochreous-yellow; thorax and abdomen brighter ochreous: *fore wing* with a short, indistinct, blackish maculated discal band crossing from upper end of the cell, and thence obliquely to above middle of posterior margin; a similar-coloured spot within middle of the cell, one below it, and another at base of the costa: *hind wing* with an indistinct similar-coloured spot at upper end of the cell, crossed by the discocellular vein. Abdomen with a dorsal and lateral row of very small black spots. Palpi, fore legs, and tarsi above black-streaked; pectinations of antennæ blackish.

Expanse  $1\frac{1}{2}$  inch.

*Hab.* N.W. Himalaya. In coll. F. Moore.

Fam. LIPARIDÆ.

AROA OCHRIPICTA, n. sp.

*Male.* Bright ochreous-red; fore wing slightly brownish along the costal border and below the cell.

*Female.* Pale greyish ochreous-brown, greyest on fore wing.

Expanse, ♂  $1\frac{2}{10}$ , ♀  $1\frac{5}{10}$  inch.

*Hab.* Hong-kong. In coll. Dr. O. Staudinger.

Allied to *A. substrigosa*, Walker, from Assam, and to *A. socrus*, Hübn. Zutr. f. 837, from Java.

ARTAXA UNIMACULA, n. sp.

*Male and Female.* Fore wing clear ochreous, with a broad median transverse, pale-bordered, darker band, which is less apparent in the female; a single black spot before the apex. Cilia whitish. Hind wing yellowish white. Abdomen brownish, tuft ochreous.

Expanse, ♂  $1\frac{3}{8}$ , ♀  $1\frac{5}{8}$  inch.

*Hab.* Khasia hills (*G.-Austen*). In coll. F. Moore.

Allied to *A. diagramma*, Boisd.; distinguished by having but a single apical black spot, and in the difference of the colour of the abdomen.

ARTAXA LEITHIANA, n. sp. (Plate XXXII. fig. 9.)

*Male and Female.* Upperside pale yellow: fore wing with a median transverse, recurved, oblique, black maculated band, terminating within end of the cell and not extending hindward to the margin. Abdomen ochreous. Underside—fore wing in male dusky

brown along anterior border. Palpi dusky brown at the side. Fore legs ochreous-brown in front.

Expanse, ♂  $1\frac{2}{8}$ , ♀  $1\frac{5}{8}$  inch.

*Hab.* Bombay (*Dr. Leith*), N. Canara (*Ward*). In coll. F. Moore.

*ARTAXA ERECTA*, n. sp. (Plate XXXII. fig. 6.)

*Female.* Pale yellow: *fore wing* with a broad, median, transverse, erect, ochreous-brown speckled band.

Expanse  $1\frac{3}{8}$  inch.

*Hab.* Canara, S. India (*Ward*). In coll. F. Moore.

*ARTAXA BREVIVITTA*, n. sp. (Plate XXXII. fig. 10.)

*Male.* Ochrey-yellow, paler on hind wing: *fore wing* with a broad, black-speckled, short band, extending from middle of hind margin upward to end of the cell. Underside of anterior border ochreous.

Expanse  $1\frac{1}{8}$  inch.

*Hab.* Bengal (*Russell*). In coll. F. Moore.

Allied to *A. howra*, Moore, from Calcutta. Distinguished from it by the broad band on hind margin and in the absence of a black cell-spot.

*EUPROCTIS SUBDITA*, n. sp.

*Male.* Upperside white: *hind wing* with the anterior border and apex thickly irrorated with brown scales; anal tuft bright yellow. Underside—*fore wing* with the anterior border broadly dusky black: *hind wing* with the anterior border narrowly speckled with brown. Antennæ dusky brown, shaft white.

Exp. 1 inch.

*Hab.* Ceylon. In coll. F. Moore.

Allied to *E. auriflua* of Europe. Distinguished by its smaller size and absence of markings on the fore wing.

*EUPROCTIS FLAVONIGRA*, n. sp. (Plate XXXII. fig. 11.)

*Male.* Upperside—*fore wing* yellow: *hind wing* dark ochreous-brown. Body whitish; anal tuft yellow. Underside uniform dusky ochreous-brown. Cilia yellow. Antennæ blackish, shaft white. Legs yellowish above, white beneath.

Expanse  $1\frac{1}{8}$  inch.

*Hab.* Nepal (*Gen. Ramsay*). In coll. F. Moore.

Allied to *E. subnigra*, Moore, from Cherra Punji, and may be distinguished from it by the difference in colour.

*EUPROCTIS POSTINCISA*, n. sp. (Plate XXXII. fig. 5.)

*Female.* White: *fore wing* with a median, transverse, narrow, black band, which is outwardly angled at the end of the cell; short oblique black line from posterior angle.

Expanse  $1\frac{4}{10}$  inch.

*Hab.* N.E. Bengal (*A. Grote*). In coll. F. Moore.

## -PIDA ALBODENTATA, n. sp.

*Female*. Upperside dull ochreous-white: *fore wing* minutely brown-speckled; a broad, transverse, median, ochreous-brown speckled band crossed by pale veins; a row of white dentate spots along outer margin. Underside paler, without markings.

Expanse  $1\frac{7}{8}$  inch.

*Hab.* N.W. Himalaya. In coll. F. Moore.

## -REDOA CYGNA, n. sp.

*Male and Female*. Wings silky white, covered with minute silvery scales: *fore wing* with a small black spot at end of the cell. Body and legs white. Front of head, tip of palpi, and legs spotted with dark brown.

Expanse  $1\frac{6}{8}$  inch.

*Hab.* N.E. Bengal (*A. Grote*). In coll. F. Moore.

## -CALTURA, n. g.

Wings broad: *fore wing* trigonal, elongated in female; costa arched at base, apex rounded, exterior margin oblique; first branch of subcostal vein starting from some distance before the end of the cell, second quadrifid, fifth or lowest being nearest the cell; discocellulars bent in the middle, upper angled; radial from angle of upper discocellular; median vein four-branched, two upper from angles at end of the cell: *hind wing* broad, apex and exterior margin very convex; subcostal two-branched from angle at end of the cell; upper discocellular short, lower long and very oblique; median vein as in fore wing. Body moderate; abdomen as long as hind wing. Palpi pilose, porrect. Legs covered with short spinous hairs. Antennæ bipectinate.

## -CALTURA ALBA, n. sp.

*Male and Female*. White, semidiaphanous, covered with raised white scales: *fore wing* with two transverse black lines, the first sub-basal and zigzag, the other discal, oblique, and bent near the costa; a short, oblique, discocellular black streak; both wings with a marginal row of small black spots. Thorax black-spotted; abdomen in male with dorsal and lateral row of black spots. Legs hoary above.

Expanse ♂  $1\frac{6}{8}$ , ♀  $2\frac{3}{8}$  inches.

*Hab.* Ceylon (*Sir W. Gregory*). In coll. Dublin Museum.

## -DASYCHIRA KAUSALIA, n. sp.

*Male*. Upperside pale brownish grey: *fore wing* minutely irrorated with black scales, crossed by indistinct basal, discal, and marginal sinuous dusky lines; a lunule at end of the cell: *hind wing* pale greyish brown, yellowish on abdominal margin; cilia whitish; an indistinct dusky spot at end of the cell. Underside paler; both wings with a dusky brown, broad, dentate streak at end of the cell, and a transverse, discal, indistinct fascia.

Expanse  $1\frac{4}{8}$  inch.

*Hab.* Kussowlee, N.W. Himalaya. In coll. F. Moore.

Near to *D. horsfieldi*, Saunders, from Java and S. India. It may possibly prove to be the male of *D. strigata*, Moore (Asiat. Soc. Beng. Desc. Lep. Atk. Coll. p. 59), described from a female in the collection of Dr. Staudinger from Gurhwal.

*LYMANTRIA SOBRINA*, n. sp. (Plate XXXIII. fig. 5.)

*Male and Female.* Greyish vinous brown, palest and greyer in the female: *fore wing* crossed by five black zigzag bands, the three interior broad, the two outer narrow and sinuous; a marginal row of small triangular spots, which also cross the cilia; a spot within the cell crossing the second band; two spots below the cell. Abdominal border and abdomen in male reddish, ochreous in female, the abdomen with black bands. Collar reddish. Underside pale brown, with the costa and outer borders pale ochreous and black-spotted, the base of hind wing also pale ochreous and brown-streaked. Legs with blackish bands.

Expanse, ♂ 2, ♀  $2\frac{5}{8}$  inches.

*Hab.* Dharmasala, N.W. Himalaya. In coll. F. Moore.

The markings in this species are disposed on the fore wing similarly to those in *L. superans*.

--*LYMANTRIA TODARA*, n. sp. (Plate XXXIII. fig. 6.)

*Male.* *Fore wing* pure white, crossed by narrow, not very prominent, black zigzag lines, basal spots, a spot in the cell, and a marginal series of spots: *hind wing* and abdomen pale yellowish ochreous, the former with a rather broad marginal brown band. Underside pale ochreous-white; markings of upperside very indistinct. Palpi black at the side. Legs black-streaked. Thorax white above, with black spots.

Expanse  $1\frac{7}{8}$  inch.

*Hab.* Nilgiris, S. India. In coll. F. Moore.

--*LYMANTRIA SIMILIS*, n. sp.

*Male.* *Fore wing* greyish white, crossed by narrow black zigzag lines, basal and marginal spots, and small spots in the cell: *hind wing* greyish brown, with black marginal spots. Head and thorax white, the latter black-spotted. Abdomen reddish, with black bands. Palpi black at the side. Legs black-spotted. Antennæ brown, shaft white. Underside pale ochreous-brown, with costal and marginal blackish spots, and indistinct transverse bands.

Expanse  $1\frac{7}{8}$  inch.

*Hab.* Calcutta district (*Farr.*). In coll. F. Moore.

Allied to *L. monacha* and *L. superans*, markings on fore wing similar, but narrower, hind wing being broader and without the marginal band.

--*LYMANTRIA VINACEA*, n. sp.

*Female* vinous-grey: *fore wing* crossed by indistinct brownish zigzag bands; marginal spots and a spot at end of the cell: *hind*



*wing* with narrow brown marginal band. Thorax brown. Palpi and legs brown-streaked. Underside brighter-coloured.

Expanse  $1\frac{7}{8}$  inch.

*Hab.* Canara, S. India (*Ward*). In coll. F. Moore.

LYMANTRIA SINICA, n. sp.

*Male* greyish brown: *fore wing* crossed by darker zigzag inner bands, and an outer broader lunular whitish speckled band; an angled blackish streak at end of the cell, and a marginal series of small spots: *hind wing* with indistinct darker marginal band. Underside paler, with very indistinct costal and marginal spots, and a spot at end of the cell. Thorax brown, collar red. Abdomen reddish-tinged. Palpi dusky black at the side. Legs with black bands.

Expanse  $1\frac{4}{8}$  to  $1\frac{6}{8}$  inch.

*Hab.* N. China (Shanghai) and Formosa. In coll. F. Moore.

LYMANTRIA ALBOLUNULATA, n. sp.

*Male and Female.* Greyish brown, darkest in female: *fore wing* crossed by indistinct, black-speckled, sinuous bands, and marginal row of spots, the outer band lunular and white-speckled; a prominent black-angled mark at end of the cell, a narrow streak before it, and broader straight streak below the cell: *hind wing* with indistinct maculated marginal border and cilia. Thorax dark brown, with slight red collar. Abdomen reddish, with brownish bands. Underside pale brown, with blackish costal and marginal spots, and indistinct angled mark at end of the cell. Palpi reddish and black at the side. Legs slightly reddish and black-streaked.

Expanse, ♂  $1\frac{4}{8}$ , ♀  $2\frac{1}{8}$  inch.

*Hab.* Simla, Dharmasala, N.W. Himalaya. In coll. F. Moore.

Fam. NOTODONTIDÆ.

MOMA CHAMPA, n. sp. (Plate XXXIII. fig. 2.)

*Male and Female.* Cinereous white, slightly vinous-tinted in the male. Cilia alternated with black. *Fore wing* with black basal and costal zigzag streaks, a double subbasal and discal transverse sinuous lines, the intermediate space streaked and spotted, and suffused with black hindward; an oval ringlet near end of the cell; a submarginal interrupted broader sinuous line, and marginal row of short, narrow, straight, longitudinal streaks: *hind wing* dusky at the apex, yellowish on abdominal border, veins externally and a marginal line black. Head and thorax white, transversely black-streaked. Abdomen yellowish, with dorsal row of black and white tufted spots; apical tuft white in male. Underside—*fore wing* blackish anteriorly, costa white-spotted: *hind wing* with short black apical and discal band, costal streak, a small spot at end of the cell, and veins externally black. Palpi white, the tip and a lateral streak black. Legs white with black bands. Allied to *M. ludifica*, of Europe.

Expanse, ♂  $1\frac{4}{8}$ , ♀  $1\frac{5}{8}$  inch.

*Hab.* Dharmasala, N.W. Himalaya. In coll. F. Moore.

—*STAUROPUS ALBESCENS*, n. sp.

Greyish white; fore wing, and hind wing along anterior border, minutely brown-speckled: fore wing with very indistinct, median, transverse, sinuous bands, and a submarginal series of ochreous-brown spots. Abdomen with a dorsal series of blackish-speckled tufts. Underside white. Palpi and legs brown-streaked.

Expanse 2 inches.

*Hab.* Mangalore, S. India (*Ward*). In coll. F. Moore.

—*STAUROPUS INDICUS*, n. sp.

Upperside pale ochreous-grey; cilia alternated with brown: *fore wing* with the basal half and costal border densely clouded with dark brown scales indistinctly disposed in confluent sinuous bands; apical half sparsely brown-speckled; a submarginal oblique row of brown pale-speckled points: *hind wing* with the anterior border and apex broadly brown-speckled, indistinctly disposed in sinuous bands; abdominal border sparsely speckled; a brown-speckled marginal line and pale lunular spaces. Body greyish brown, tip ochreous-grey. Underside paler, without speckles. Front of head and palpi dark brown. Antennæ brown, shaft grey.

Expanse  $1\frac{4}{5}$  inch.

*Hab.* N.E. Bengal (*A. Grote*). In coll. F. Moore.

—*STAUROPUS VIRESCENS*, n. sp.

*Male.* Upperside—*fore wing* pale green, with two equidistant, transverse, median, brown-speckled sinuous lines, the outer double and pale grey-bordered; an indistinct row of submarginal, pale, grey-bordered, brown-speckled spots, and a more prominent row of marginal brown spots; cilia whitish: *hind wing* with the costal border green, and crossed by brown wavy streaks, the rest of the wing pale brown. Front of head and thorax green; abdomen pale brown, tipped with pale green. Antennæ brown, shaft grey. Underside pale greenish grey. Fore and mid legs green and brown-speckled above, grey beneath; mid legs greenish grey. Palpi ochreous-grey, dark brown at the side.

Expanse  $1\frac{3}{10}$  inch.

*Hab.* Darjiling (*A. Grote*). In coll. F. Moore.

—*STAUROPUS VINACEUS*, n. sp. (Plate XXXIII. fig. 1.)

Upperside—*fore wing* vinous-brown, irrorated with grey scales; base obliquely grey, and bordered by a narrow black line; a submarginal indistinct black sinuous line, and an outer marginal series of short, black, grey-bordered zigzag streaks: an indistinct pale vinous longitudinal fascia above the hind margin, a similar one from below end of the cell, and a shorter one before the apex: *hind wing* brown. Abdomen greyish brown. Thorax brown, speckled with grey hindward. Underside pale rufous-brown, greyish along hind margins. Palpi and legs black-speckled.

Expanse 2 inches.

*Hab.* India. In coll. F. Moore.

## SPHETTA APICALIS, n. sp. (Plate XXXIII. fig. 7.)

*Male.* Upperside—*fore wing* dark umber-brown, with a pale testaceous black-streaked patch from the apex of costa, which terminates in an oblique paler reniform mark at the end of cell; a small pale testaceous spot in middle of the cell; the space immediately below the apical patch black-speckled; a subbasal and discal pale narrow sinuous band, and a marginal series of black points: *hind wing* and abdomen fuliginous-brown. Underside pale silky-testaceous, with brownish outer borders and pale marginal points: *hind wing* with an indistinct brown lunule at end of the cell, and a curved discal narrow band. Thorax above and vertex black-speckled; palpi black at side; fore and middle legs blackish above; antennæ brown.

Expanse  $1\frac{5}{8}$  inch.

*Hab.* Darjiling. In coll. F. Moore.

## SPHETTA BIOCELLATA, n. sp.

*Female.* Upperside ferruginous-brown: *fore wing* with the costal border its entire length longitudinally marked with short blackish dentate streaks; a pale testaceous apical patch, the lower border of which is black, its shape being sinuous from the apical angle and then straight to end of the cell; an oval pale spot with a blackish centre at end of the cell, and a darker similar spot, with black intermediate space, within the cell; a blackish subbasal transverse sinuous double line, a similar line curving upward from its base to below the end cell-spot; veins on the disk with short black streaks; a pale submarginal indistinct narrow fascia, and a row of black dentate marginal points: *hind wing* and abdomen pale ferruginous-brown. Underside paler, with darker interspaces between the veins on the fore wing, and streaks along the veins on hind wing; both wings with a blackish spot at end of the cell, and black dentate marginal line.

Expanse  $2\frac{1}{8}$  inches.

*Hab.* Bombay. In coll. F. Moore.

## GLUPHISIA SINUATA.

*Female.* *Fore wing* with a brownish ochreous band along exterior margin, bordered within by a sinuous irregular black line; from the band to the base the wing is speckled with black, showing a slightly prominent spot at end of the cell and streaks on middle of hind margin: *hind wing* cinereous-brown, with a slight dusky streak at end of the cell and indistinct median transverse band. Body cinereous-brown. Underside pale cinereous-brown, with indistinct streak at end of cells and band on hind wing.

Expanse  $1\frac{4}{8}$  inch.

*Hab.* N.E. Bengal. In coll. W. B. Farr.

## RACHIA PLUMOSA. (Plate XXXIV. fig. 1.)

*Rachia plumosa*, Moore, Asiat. Soc. Beng. Desc. Lep. Atk. Coll. p. 70 (1878).

*Hab.* Darjiling. In coll. Dr. Staudinger and F. Moore.

## Family BOMBYCIDÆ.

## ARISTHALA, Moore.

*Aristhala*, Moore, P. Z. S. 1878, p. 704.

## -ARISTHALA SIKKIMA, n. sp. (Plate XXXIII. fig. 3.)

*Male*. Greyish ferruginous: *fore wing* purple-brown below the cell and along exterior border; a white-bordered bent subbasal and a zigzag transverse discal blackish line, two blackish median transverse fasciæ and an oblique streak from middle of costa to outer median fascia, two semidiaphanous white spots on middle of exterior border; cilia black-streaked: *hind wing* with two purple-brown median curved transverse and short subbasal bands, two semidiaphanous white spots, bordered above with purple-brown streaks on exterior margin near angle, the angle brighter ferruginous; abdominal margin and fringe grey and purple-brown. Underside—*fore wing* yellowish-ferruginous; two discal transverse brown bands: *hind wing* brighter ferruginous, two curved discal bands, two small black discocellular spots, and a purple-brown grey-speckled fascia near abdominal margin from base to white subbasal spots.

*Female*. Brighter yellowish ferruginous: *fore wing* clouded with dark purplish ferruginous along posterior and exterior borders, and *hind wing* at base and angle; transverse markings and white spots less distinct. Thorax greyish-ferruginous in male, dark ferruginous in female; abdomen dull ferruginous, hoary in male; antennæ deep ferruginous; front of head and legs brighter ferruginous.

Expanse, ♂  $1\frac{3}{4}$ , ♀  $2\frac{3}{8}$  inches.

*Hab.* Darjiling. In coll. F. Moore and British Museum.

## -HANISA, n. g.

*Fore wing* trigonal; costa slightly concave near the base, apex rounded, exterior margin very oblique and angular in the middle, hind margin short; costal and subcostal veins contiguous to margin; subcostal vein five-branched, first and second branches parallel, third trifurcate, the lower fork terminating below the apex; upper radial starting from upper end of the cell; cell narrow, short; a discoidal vein emitted within the cell; lower radial from middle of discocellulars; median vein three-branched, middle branch terminating at angle on exterior margin, submedian straight. *Hind wing* elongated hindward, convex externally; abdominal margin long, extending to end of abdomen, fringed and slightly produced at anal angle; subcostal vein two-branched; cell short; median vein three-branched. Body long, slender; anal tuft fan-shaped. Antennæ short, broadly bipectinate; legs short, pilose.

Allied to genera *Aristhala*, *Trilocha*, *Ocinara*, and to *Bombyx* (*B. mori*).

## -HANISA SUBNOTATA.

*Bombyx subnotata*, Walk. Journ. Linn. Soc. iii. p. 188 (1859).

*Hab.* Singapore (*Wallace*). In coll. Saunders, Oxford University Museum.

## Family DREPANULIDÆ.

## — DREPANA SPECULARIS, n. sp.

*Female.* Upperside pale testaceous-brown: *fore wing* with the veins externally and a transverse submarginal oblique narrow band pale testaceous-yellow; a dark-bordered paler blotch at base, below and beyond the cell; the rest of the wing numerous covered with short pale strigæ; a narrow dusky lunule at end of the cell; a marginal row of small black-speckled spots: *hind wing* pale testaceous-yellow anteriorly, dark brown posteriorly, and lined with pale veins and traversed by short pale strigæ; a narrow pale band crossing the disk, outside which are two median, oval, contiguous semidiaphanous pale spots; a marginal row of black-speckled spots. Underside black-speckled; transverse band on both wings black and broader; marginal speckled spots confluent on hind wing; shaft of antennæ white; pectinations and legs brown.

Expanse  $2\frac{1}{2}$  inches.

*Hab.* Ceylon (*Sir W. Gregory*).

## Family LASIOCAMPIDÆ.

## — MUSTILIA SPHINGIFORMIS, n. sp. (Plate XXXIII. fig. 4.)

*Male and Female* ochreous-red, darkest along external border of fore wing and on abdominal half of hind wing: *fore wing* with an oblique indistinct brown wavy line from apex to near posterior angle, and two median transverse irregular brown lines, retracted inward to costa; an indistinct costal streak before the apex, and a small dot at end of cell: *hind wing* dull yellowish on anterior border. Underside dull yellowish ochreous: *fore wing* with an indistinct curved brown line from apex, and hind wing with two transverse median indistinct lines; shaft of antennæ and narrow frontal band at base white.

Expanse, ♂ 2, ♀ 3 inches.

*Hab.* Masuri, N.W. Himalaya (*Major Hutton*). In coll. F. Moore.

## — KOSALA, n. g.

*Female.* *Fore wing* somewhat short and narrow; costa arched near end, apex acute, exterior margin slightly oblique, posterior angle convex; first branch of subcostal vein arising at half length of the cell, second near its end and forked at one third its length, fourth from end of the cell and also forked at one third its length; discocellulars slender, curved inward; radial from upper end of the cell; median vein four-branched, the two upper from end of the cell; submedian running near the margin. *Hind wing* truncated; anterior margin short, angled at apex; exterior margin truncated, convex in middle; hind margin long, nearly straight; subcostal branches straight, from near base of the cell; median four-branched, the branches contiguous at their base; a median and internal vein. Body robust, extending slightly beyond hind wing; antennæ bipec-

minate, the pectinations short and broad; legs pilose; palpi stout, robust, densely pilose, extending slightly beyond the head.

Allied to *Eutricha*.

—*KOSALA SANGUINEA*, n. sp. (Plate XXXIII. fig. 8.)

*Female*. Upperside deep red: *fore wing* with two indistinct median transverse narrow black lines, the inner slightly curved, the outer oblique; an indistinct outer zigzag series of blackish marks; a grey-speckled patch at the apex; a white angular discocellular spot between the transverse black lines: *hind wing* duller red posteriorly; an indistinct black grey-speckled streak below the apex; apical border grey-speckled. Underside reddish brown; both wings crossed by an indistinct narrow dusky discal fascia.

Expanse  $2\frac{1}{8}$  inches.

*Hab.* Khasia hills (*Godwin-Austen*). In coll. F. Moore.

—*EUTRICHA CHEELA*, n. sp.

Allied to *E. pini*.

*Male*. Upperside reddish fawn-colour: *fore wing* with an exterior submarginal deeply sinuous black line, from near which the inter-discal space is bright dark ferruginous and traversed with irregular transverse dusky black lines. Underside brownish fawn-colour; both wings with an oblique transverse darker brown median band, and an indistinct outer lunular band.

Expanse  $2\frac{1}{2}$  inches.

*Hab.* Dharmasala, N.W. Himalaya. In coll. Lahore Museum.

—*ODONESTIS PYRIFORMIS*, n. sp. (Plate XXXIV. fig. 7.)

*Male*. Upperside deep ferruginous, washed with purple externally; *fore wing* with a narrow transverse subbasal curved line, and an oblique recurved discal line with pale outer border; an outer submarginal dusky sinuous line; a large whitish red-centred oblique pyriform spot at end of the cell, and a small white spot above it. Underside paler; both wings crossed by an indistinct dusky discal fascia.

Expanse  $1\frac{1}{2}$  inch.

*Hab.* Masuri, N.W. Himalaya. In coll. Major A. M. Lang and F. Moore.

Allied to *O. decisa*, Walk. Differs in being smaller, the wings shorter and darker in colour, and having a prominent large cell-spot, the discal line being less oblique. From *O. laeta* and *O. inobtrusa* it is also distinct.

—*ODONESTIS DIVISA*, n. sp.

*Female*. Upperside—*fore wing* dark chestnut-red, dusky red posteriorly, and washed externally with purple-grey; a narrow pale-bordered line recurving from apex to middle of hind margin; a large pearly-white red-speckled spot at end of the cell, and a small white spot above it: *hind wing* dark chestnut-red along anterior half, pale purplish red on posterior half, the two colours defined by

a straight division. Thorax, head, palpi, and legs dusky red; abdomen pale purplish red. Underside duller-coloured.

Expanse  $2\frac{3}{8}$  inches.

*Hab.* Ceylon (*Sir W. Gregory*). In coll. Dublin Museum.

*MESSATA ÆNESCENS*, n. sp.

*Male.* Upperside ænescent-yellow: *fore wing* with three very prominent oblique, transverse, discal purple brown-speckled bands, the two inner bands linear and curved, the outer one composed of broad lunules; an inner series of three less oblique, very indistinct, and sparsely speckled bands: *hind wing* with a distinct submarginal broad purple brown-speckled lunular band. Thorax, head, and fore legs dark ochreous-yellow. Underside duller-coloured, with the bands as above, very indistinct.

Expanse  $2\frac{1}{8}$  inches.

*Hab.* Ceylon (*Sir W. Gregory*). In coll. Dublin Museum.

May be distinguished from *M. plumipes* (*Dreata plumipes*, Walk. Catal. Lep. B. M. iv. p. 907) by the curvature and greater obliquity of the bands on the fore wing, and by the lunular submarginal band on the hind wing.

*MESSATA QUADRIFASCIATA*, n. sp.

*Male.* Upperside brownish ochreous: *fore wing* numerous speckled with black scales; two oblique transverse black discal bands, the inner band broad and very prominent: *hind wing* with two black-speckled bands, the inner median, the outer indistinct. Thorax, head, and underside brighter ochreous; the inner band on both wings prominent.

Expanse  $2\frac{3}{8}$  inches.

*Hab.* Colombo, Ceylon (*Hutchison*). In coll. F. Moore.

*MESSATA FRATERNA*, n. sp. (Plate XXXIV. fig. 6.)

*Female.* Upperside reddish-ferruginous, palest on hind wing: *fore wing* with two oblique, submarginal, indistinct, narrow dusky bands, and hind wing with a single outer band. Underside much paler.

Expanse 2 inches.

*Hab.* Bombay (*Dr. Leith*). In coll. F. Moore.

*MESSATA VIALIS*, n. sp.

*Male.* Upperside luteous-brown: *fore wing* with a prominent oblique discal black band with pale yellow outer border: *hind wing* with a very indistinct median and submarginal transverse dusky bands. Underside paler; a dusky oblique band on fore wing slightly apparent. Front of head, palpi, and legs above dark brown.

Expanse  $2\frac{3}{4}$  inches.

*Hab.* Ceylon (*Sir W. Gregory*). In coll. Dublin Museum and F. Moore.

## EUPTEROTE, Hübner.

(Dreata (part.), Walker.)

## -- EUPTEROTE OCHRIPICTA, n. sp.

*Male and Female.* Allied to *E. fabia* (Cram. Pap. Exot. pl. 250. f. B). Upperside deep ochreous-yellow: *fore wing* with four purple-brown transverse subbasal and three discal narrow sinuous bands, an intervening median broader maculated band, a straight submarginal speckled band, which is widest and with a narrow outer line in female, and an exterior zigzag band, the interspace between the two latter, in the male, maculated and darker-blotched at anterior and near posterior end: *hind wing* with four sinuous discal bands, and a straight submarginal and zigzag outer band, with maculated interspace in male and a narrow line in female; markings in female strongest.

Expanse 5 inches.

*Hab.* Ceylon. In coll. F. M. Mackwood and F. Moore.

## EUPTEROTE CANARAICA, n. sp.

*Male.* Upperside reddish-ochreous, paling to yellowish-ochreous on the costal border and base; both wings crossed by two indistinct darker discal lunular bands, a contiguous straight band, and an outer or submarginal wider lunular band, the interspace between the latter and the straight band traversed by triangular marks, which are most prominent on the fore wing. Underside paler, marked as above; palpi at the side and streaks on the legs blackish. Female more uniform yellowish-ochreous, marked as in the male.

Expanse  $2\frac{6}{8}$  inches.

*Hab.* Canara, S. India (*Ward*). In coll. F. Moore.

## -- LASIOCAMPA BHIRA, n. sp. (Plate XXXIV. fig. 2.)

*Male.* Upperside bright ferruginous, palest on the disk: *fore wing* with the costal edge yellow; four transverse white lines, two being subbasal and straight, and two discal recurving outward to the costa; beyond these is a fifth, transverse fuliginous line. Underside yellowish ferruginous, but darker ferruginous exteriorly; veins and scarcely perceptible transverse streaks yellow.

Expanse  $1\frac{3}{4}$  inch.

*Hab.* Dharmasala, N.W. Himalayas. In coll. Lahore Museum.

## SUANA CERVINA, n. sp.

*Female.* Upperside dark brownish fawn-colour: *fore wing* grey-speckled, crossed by four indistinct median transverse dusky lunular bands, the two inner bands bent across the cell towards base of costa; an outer submarginal band of blacker and broader pale-bordered lunules; a grey-white spot at base of wing, and a prominent large silvery-white spot at end of the cell: *hind wing* with a very indistinct dusky-brown submarginal fascia. Thorax, head, and palpi dark purplish black; tibiae and tarsi above black; abdo-



men reddish; antennæ grey. Underside uniform brownish fawn-colour.

Expanse  $3\frac{3}{4}$  inches.

*Hab.* Ceylon (*Sir W. Gregory*). In coll. Dublin Museum and F. Moore.

Distinguished from *S. bimaculata*, which is also found in Ceylon, in being a third less in size and of a very much darker colour. The larva, of which drawings of both species are before me, is also differently marked from that of *S. bimaculata*.

#### BRACHYLIA, Felder.

*Brachylia*, Felder, Noy. Voy. Lep. v. pl. 82. f. 7.

BRACHYLIA ACRONYCTOIDES, n. sp. (Plate XXXIV. fig. 4.)

*Male and Female.* Upperside—*fore wing* greyish-brown, greyest at the apex, crossed externally by black wavy, partly interrupted reticulations, some of which are disposed in an outwardly oblique line across the disk: *hind wing* pale greyish brown, indistinctly marked with black reticulations. Underside fuliginous brown, reticulations somewhat confluent and darkest in male; abdomen greyish brown, paler beneath, and with pale bands above; antennæ dark brown.

Expanse  $1\frac{3}{8}$  to  $1\frac{5}{8}$  inch.

*Hab.* Bombay (*Dr. Leith*). In coll. F. Moore.

#### ARBELA, n. g.

*Fore wing* elongated; costa nearly straight, exterior margin oblique and slightly convex; posterior margin convex at base; third subcostal vein trifid, first fork ascending at one third beyond end of the cell, second from one third before the apex: *hind wing* short, exterior margin very convex. Antennæ short, closely bipectinate; head small, palpi minute; body slender, hairy; abdomen extending one third beyond hind wing, with short dorsal lax tufts and longer anal tuft; legs hairy on one side.

ARBELA TETRAONIS, n. sp. (Plate XXXIV. fig. 3.)

Allied to *A. quadrinotata*, Walk.

*Male.* Upperside pale greyish ochreous: *fore wing* crossed by numerous compact dark-brown maculated bands, spot at end of the cell black: *hind wing* sparsely crossed by brown strigæ; cilia alternate pale and dark brown. Body greyish brown, interspersed with dark brown tufts. Antennæ and legs pale ochrey-brown. Underside greyish white, with the markings less prominent.

Expanse  $1\frac{7}{8}$  inch.

*Hab.* Bombay (*Dr. Leith*). In coll. F. Moore.

#### ARBELA TESSELLATA.

*Cossus tessellatus*, Moore, Asiat. Soc. Beng. Desc. Lep. Atk. Coll. p. 85 (1878).

*Hab.* Calcutta.

← ARBELA QUADRINOTATA.

*Cossus quadrinotatus*, Walker, Catal. Lep. Het. B. M. vii. p. 1521.

*Hab.* Ceylon.

← PHASSUS SALSETTENSIS, n. sp. (Plate XXXIV. fig. 5.)

*Male.* Upperside:—*fore wing* ferruginous-brown, crossed by a sub-basal and median band formed of dull chalybeate quadrate spaces between the veins, and outer rows of similar decussated marks: *hind wing* fuliginous-brown; costal border and cilia ferruginous-brown. Thorax and legs dark fuliginous-brown, abdomen pale. Underside dark fuliginous-brown.

Expanse  $2\frac{3}{8}$  inches.

*Hab.* Bombay (*Dr. Leith*). In coll. F. Moore.

← PHASSUS MALABARICUS, n. sp.

*Male.* Pale umber-brown: *fore wing* with broad pale greyish chalybeate streaks, with dark-brown borders on the costa, a triangular space in the cell, narrow streaks on hind margin from the base, and transverse discal and submarginal band formed of quadrate marks; a yellow lunule ascending obliquely from end, and a longitudinal narrow mark near base of the cell: *hind wing* ochreous-brown along the costa, greyish at base. Abdomen greyish at base.

*Female.* Pale brownish ochreous; markings as in male, except that the yellow mark at end of the cell is tear-shaped.

Expanse, ♂  $3\frac{3}{4}$ , ♀  $4\frac{3}{4}$  inches.

*Hab.* Sirey, N. Canara (*Ward*); Ooty, Niligiris (*Dr. Day*). In coll. F. Moore.

← PHASSUS CHALYBEATUS, n. sp.

*Male.* *Fore wing* pale ferruginous, greyish at the base and along outer margin; some greyish chalybeate brown-bordered spaces on the costa, a broad triangular space across middle of the cell, a wavy band across the disk, a submarginal row of duplex lunules or letter-X-shaped marks, and narrow streaks on hind margin; a serial row of dark-brown dots between the chalybeate discal band and submarginal lunules; a narrow white upright lunule at end, and a similar though less apparent lunule near base of the cell: *hind wing* pale ferruginous, veins darker, with some narrow greyish chalybeate streaks on costa near the apex. Thorax and legs ochreous-brown. Abdomen paler.

*Female.* Upperside dark ferruginous: *fore wing* with some darker quadrate spots on costa; discal and submarginal bands formed of indistinct, mostly quadrate, chalybeate irregular spaces between the veins; the interspaces between the bands darker ferruginous; a recurved chalybeate streak from the base, and short streaks on hind margin: *hind wing* brownish ferruginous, palest at the base; some pale chalybeate marks on costa near apex. Underside uniform pale ferruginous. Palpi and legs dark ferruginous.

Expanse, ♂ 3, ♀ 5 inches.

*Hab.* Darjiling (*A. Grote*). In coll. F. Moore.

PHASSUS ALBOFASCIATUS, n. sp. (Plate XXXIV. fig. 8.)

*Male.* Upperside pale umber-brown, darkest on costal border of both wings: *fore wing* with an indistinct, whitish, longitudinal median fascia from base to below apex, which is slightly black-speckled; a few black delicate streaks on hind margin from the base; a series of black dots on outer margin. Thorax, palpi, and legs dark umber-brown. Abdomen paler, with a yellow lateral streak near the base. Underside uniform umber-brown.

Expanse  $2\frac{1}{8}$  inches.

*Hab.* Nilgiris. In coll. F. Moore.

HEPIALUS SEXNOTATUS, n. sp.

Upperside ochreous-brown: *fore wing* crossed by four curved, darker, maculated indistinct bands, the outer band marginal and slightly yellow-speckled; a blackish spot on middle of hind margin, and a yellow streak nearer the base; a rather large round white spot crossing the cell near the base, and two smaller spots below the cell and nearer the base; some yellow-speckled oblique streaks on costa before the apex: *hind wing* with the base ochreous, and a broad yellow band on cilia in middle of outer margin. Body ochreous-brown, base of abdomen with long ochreous hairs. Underside ochreous at base of both wings; ciliary band as above.

Expanse  $1\frac{1}{4}$  inch.

*Hab.* Darjiling. In coll. F. Moore.

HEPIALUS MURINUS, n. sp.

*Male.* Upperside umber-brown: *fore wing* with a small triangular yellow spot within the cell near the base, and a smaller round spot beneath it near the base of the wing. Cilia on hind wing below the apex yellow. Underside uniform umber-brown.

Expanse  $1\frac{1}{10}$  inch.

*Hab.* Dharmasala, N.W. Himalaya. In coll. F. Moore.

PYRALES.

Fam. ÆGERIIDÆ.

—MELITTIA GIGANTEA, n. sp.

Margins and veins dark brown; apical border narrow, speckled with purple-grey scales; costal border and hind margin at their base ochreous; apical area large, traversed by four veins; basal area traversed by median vein and a short discoidal vein. Abdominal area of hind wing ochreous-red. Cilia of both wings purplish cinereous. Head in front and thorax dark ochreous, reddish at base. Abdomen above purple-brown, marked with ochreous scales, segmental bands narrow and yellowish, underside yellow. Palpi yellow, slightly fringed with black; pectus yellow. Fore and mid legs ochreous-red, yellow beneath. Hind legs densely covered throughout with long hairs, yellow on the inside of tibia, bright chestnut-

red on outside of tibia and tarsus, and black on inside of tarsus. Antennæ dull ferruginous, shaft black.

Expanse  $1\frac{1}{10}$  inch.

*Hab.* Masuri, N.W. Himalaya (*Hutton*). In coll. F. Moore.

— *PSEUDOSIESIA GROTEI*, n. sp.

Margins, veins, and discocellular streak in both wings steel-blue; apical band and cilia purple; apical area traversed by four veins, basal area by median vein only. Thorax, frontal tuft, and abdomen steel-blue. Palpi and pectus fulvous. Legs steel-blue, fringed with short fulvous hairs above.

Expanse  $1\frac{2}{3}$  inch.

*Hab.* N. India. In coll. F. Moore.

The genus *Pseudosiesia* of Felder is allied to *Melittia*, but differs in the absence, on the hind wing, of the branch of the costal vein, in the two upper median branches starting together from end of the cell; the body is much more attenuated, the anal segment and the legs not densely pilose.

## GEOMETRES.

### Fam. EUSCHEMIDÆ.

— *EUSCHEMA BELLISSIMA*, n. sp.

*Male and Female.* Blackish purple. *Fore wing* with two pale-yellow, elongated, straight basal streaks, the upper within the cell, the lower beneath it, and a yellow spot above and another below the submedian vein; a large bluish-white diaphanous spot in middle of the cell, one below it, two at its end, and a transverse discal series of spots: *hind wing* with a broad yellow subbasal band, a median, irregular, indistinct fascia, a zigzag discal and a marginal series of small yellow spots. Body yellow, with black-purple bands. Under-side as above, the yellow markings broader and more prominent.

Expanse, ♂  $2\frac{1}{2}$ , ♀  $2\frac{1}{3}$  inches.

*Hab.* Ceylon (*Sir W. H. Gregory*). In coll. Dublin Museum.

Nearest allied to the Bornean species, *E. subrepleta*, Walk.

*EUSCHEMA PRUNICOLOR*, n. sp.

Upperside dark glossy purple: *fore wing* with an elongated and a short ochreous streak between the lower median branch and submedian vein; two small bluish diaphanous spots within the cell, two at its end, a subapical oblique series and three on the disk: *hind wing* with an indistinct, ochreous, short subbasal patch, some brighter ochreous small spots on the disk, a submarginal zigzag series, and a marginal dentate series. Abdominal border partly yellow. Body yellow; head, thorax, and abdomen above with purple bands. Palpi black-tipped. Antennæ purple-black. Underside—*fore wing* as above: *hind wing* with a short costal and subbasal band, and larger discal, submarginal, and marginal spots than above. Legs above grey, yellow beneath.

Expanse  $2\frac{2}{3}$  inches.

*Hab.* Ceylon. In coll. Capt. Wade.

## CUSUMA, n. g.

Differs from typical *Euschema* (*E. militaris*, Linn.) in the abbreviated and trigonal shape of the fore wing, the exterior margin being less oblique and the posterior margin shorter: neuration similar; the discocellulars, however, are less acutely angled and not curved posteriorly: *hind wing* also shorter and more convex exteriorly. Thorax clothed with shorter and less shaggy hair. Palpi smaller, less pilose, terminal joint shorter and slightly clavate.

## CUSUMA LIMBATA, n. sp.

*Female*. Upperside—*fore wing* dark purple-black, with a bluish white, diaphanous, oblique subapical spot, crossed by two veins, and a small oblique spot within the cell: *hind wing* golden yellow, with a broad, wavy-bordered, purple-black marginal band, which extends narrowly along anterior margin and terminates in a spot at its base. Thorax, head, antennæ, dorsal bands, and tip purple-black. Abdomen above and beneath, and sides of thorax, golden yellow. Legs black above, yellow beneath. Underside of wings as above.

Expanse  $2\frac{3}{8}$  inches.

*Hab.* Ceylon. In coll. Capt. Wade.

Allied to *C. vilis* (*Euschema vilis*, Walk. Catal. Lep. Het. B. M. ii. p. 408), also from Ceylon.

## Fam.? URAPTERYGIDÆ.

## KALABANA, n. g.

*Fore wing* somewhat elongated, costa slightly arched before the end, apex acute, slightly falcate, exterior margin oblique; cell short, broad; first and second branches of subcostal vein arising before end of the cell, third trifurcate, lowest branch at one-half length from the cell; radial from upper end of the cell; discocellulars concave; median vein three-branched, two upper from end of the cell; submedian vein contiguous to posterior margin. *Hind wing* trigonal, apex and exterior margin convex; subcostal vein two-branched, first arising before end of the cell; discocellulars angled in middle; median vein three-branched; a submedian and internal vein. Body short; head small. Palpi minute, pilose, porrect. Legs slender, sparsely hairy; middle and hind spined. Antennæ in male bipectinate, the pectinations long and plumose, setose in female.

Type, *K. picaria* (*Lagyra picaria*, Walk. Catal. Lep. Het. B. M. pt. 26, p. 1541).

*Hab.* Java.

## KALABANA ALBIFERA, n. sp.

*Female*. Black: *fore wing* with a small white spot at apex, a short oblique irregular streak beyond the cell, and a conical spot on hind margin near the angle: *hind wing* with a broad white, slightly sinuous-bordered band, recurving from above anal angle to near middle of anterior margin. Underside as above.

Expanse  $2\frac{1}{8}$  inches.

*Hab.* Kulu, N.W. Himalaya. In coll. Dr. Staudinger.

Allied to *K. picaria* (*Lagyrta picaria*, Walk.), from Java, and to *K. leucomela* (*Celerena leucomela*, Walk. Catal. B. M. v. p. 1877), from the Philippines.

#### Fam. AMPHIDASYDÆ.

##### BUZURA STRIGARIA.

*Male and Female.* Upperside cinereous-white: *fore wing* with a waved subbasal and median and a sinuous, broader, discal transverse ochreous-yellow band with black-speckled borders; the interspaces numerous covered with short transverse black-speckled grey strigæ: *hind wing* with a waved median and a broad sinuous discal similar band, the interspaces as in fore wing; cilia ochreous. Thorax and abdomen with ochreous bands; front of head and legs above banded with black. Underside whitish ochreous, with numerous large black strigæ; both wings with outer ochreous band and a large black spot at end of the cell.

Expanse ♂ 2, ♀ 3 inches.

*Hab.* Ceylon (*Sir W. H. Gregory*). In coll. Dublin Museum and F. Moore.

Differs from the Indian species *B. multipunctaria*, Walk. Catal. Lep. Het. B. M. p. 1531, in its much brighter colours, prominent transverse strigæ, and black-speckled-bordered bands.

#### Fam. GEOMETRIDÆ.

##### AGATHIA MAGNIFICA, n. sp.

*Male and Female.* Upperside bright green: *fore wing* with the costal border, base of wing, a median and a submarginal transverse wavy band, and the marginal border cinereous-brown: *hind wing* with a submarginal band and marginal border cinereous-brown; a white spot at lower angle. Thorax and abdomen with cinereous-brown bands. Underside greenish white, with dusky bands as above.

Expanse  $1\frac{1}{2}$  inch.

*Hab.* Ceylon (*Sir W. H. Gregory*). In coll. Dublin Museum and F. Moore.

Differs from *A. lycenaria* in its larger size, narrower and more waved bands, which are also of uniform width their entire length.

#### EXPLANATION OF THE PLATES.

##### PLATE XXXII.

- Fig. 1. *Ratarda marmorata* ♂, n. sp., p. 393.
2. *Gonerda perornata* ♂, n. sp., p. 395.
3. *Thymara caudata*, n. sp., p. 394.
4. *Rhypparia tigrina* ♂, n. sp., p. 398.
5. *Euproctis postincisa* ♀, n. sp., p. 400.
6. *Artaxa erecta* ♀, n. sp., p. 400.
7. *Challa discalis* ♂, n. sp., p. 399.
8. *Rajendra pannosa* ♀, n. sp., p. 397.
9. *Artaxa leithiana* ♂, n. sp., p. 399.

- Fig. 10. *Artaxa brevivitta* ♂, n. sp., p. 400.  
 11. *Euproctis flavonigra* ♂, n. sp., p. 400.  
 12. *Rajendra vittata*, n. sp., p. 396.

## PLATE XXXIII.

- Fig. 1. *Stauropus vinaceus*, n. sp., p. 404.  
 2. *Moma champa*, n. sp., p. 403.  
 3. *Aristhala sikkima* ♂, n. sp., p. 406.  
 4. *Mustilia sphingiformis* ♂, n. sp., p. 407.  
 5. *Lymantria sobrina* ♂, n. sp., p. 402.  
 6. — *todara* ♂, n. sp., p. 402.  
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 8. *Kosala sanguinea*, n. sp., p. 408.

## PLATE XXXIV.

- Fig. 1. *Rachia plumosa* ♂, p. 405.  
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 7. *Odonestis pyriformis* ♂, n. sp., p. 408.  
 8. *Phassus albofasciatus*, n. sp., p. 413.

3. Descriptions of ten new Species of *Axinæa* and *Pectunculus* in the Collections of Mr. Sylvanus Hanley and the late Mr. T. L. Taylor. By GEORGE FRENCH ANGAS, Corr. Memb., F.L.S., &c.

[Received April 21, 1879.]

(Plate XXXV.)

1. *AXINÆA PULCHERRIMA*, n. sp. (Plate XXXV. fig. 1.)

Shell solid, orbicular, convex, compressed and subangulate anteriorly, with an obtuse oblique ridge extending from the umbones to the anterior portion of the ventral margin, tawny yellow, clouded and zoned with bright chestnut, and irregularly spotted here and there with darker chestnut; valves finely concentrically striated on the upper part, and closely longitudinally corrugately ridged throughout the central portion of the valves, presenting the appearance of wider flattened ribs; umbones prominent; cardinal area moderate; interior tinged with orange anteriorly; margins crenate.

Long. 15, alt. 15, lat. 10 lin.

*Hab.* Unknown. Coll. Hanley.

2. *AXINÆA NOVA-CALEDONIENSIS*, n. sp. (Plate XXXV. fig. 2.)

Shell solid, orbicular, subequilateral, equivalve, very slightly compressed and subangulate anteriorly, moderately ventricose; white, the central portion of the valves pale chestnut, fading gradually into

white towards the base, and faintly rayed with darker chestnut, the rays forming a sort of band anteriorly, which ceases somewhat abruptly towards the white margin, whilst at the umbones the chestnut rays take the form of zigzag markings; valves sculptured with very minute close-set radiating striæ, crossed by fine, irregular, somewhat laminate striæ, and towards the middle of the valves by concentric waving impressed lines that give the shell a somewhat wrinkled appearance; umbones central, tumid, a little incurved anteriorly; cardinal area narrow; interior of valves white; margins strongly crenate.

Long. 18, alt. 18, lat. 11 lin.

*Hab.* New Caledonia. Coll. Hanley.

3. *AXINÆA HANLEYI*, n. sp. (Plate XXXV. fig. 3.)

Shell solid, triangularly ovate, angled and compressed anteriorly, ventricose; pale orange, darker at the sides and towards the base, very beautifully painted with small, irregular, triangular chestnut lines that pass into confused descending rays towards the base, and with larger triangular white spots here and there, especially near the anterior margin, where they form a kind of broken white band descending from the umbones, and marked with two or three zigzag dark purple lines; valves sculptured with fine, regular, close-set, descending raised striæ, more distant towards the anterior area, and crossed by minute concentric ridges; umbones very tumid; cardinal area short and deep; interior of the valves white, spotted with dark purple anteriorly; margins strongly crenate.

Long. 14, alt. 15, lat. 10 lin.

*Hab.* Unknown. Coll. Hanley.

4. *AXINÆA MODESTA*, n. sp. (Plate XXXV. fig. 4.)

Shell solid, somewhat obliquely ovate convex, slightly subangulate anteriorly, equivalve; whitish, faintly marked with numerous indistinct pale-brown angular lines, with here and there a very few descending straight chestnut markings towards the base anteriorly; valves sculptured with fine close-set elevated striæ, less numerous towards the umbones, and crossed with a few very minute concentric striæ, and with strongly marked lines of growth that have a frilled appearance towards the ventral margin, which is clothed with a short brief epidermis; cardinal area small; umbones incurved anteriorly, brown, tinged with livid blue; interior of valves pale yellow, with a dark purple stain in front; margins crenate.

Long.  $8\frac{1}{2}$ , alt. 9, lat. 5 lin.

*Hab.* Australia. Coll. Hanley.

5. *AXINÆA BELLA*, n. sp. (Plate XXXV. fig. 5.)

Shell moderately solid, suborbicular, a little convex, subequilateral, equivalve; white, with pale yellowish brown arrow-shaped markings towards the centre of the valves, and with longitudinal patches and splashes of dark purplish brown, larger and more numerous towards the base; valves sculptured throughout with fine close-set raised striæ which are crossed by very delicate thread-like concentric lines; cardinal area small and narrow; umbones nearly approximate, livid



blue spotted with brown; interior of the valves faintly stained with purple and orange; margins crenate.

Long. 9, lat. 9, alt. 4 lin.

*Hab.* Unknown. Coll. Hanley.

6. *PECTUNCULUS CARDIIFORMIS*, n. sp. (Plate XXXV. figs. 6, 6 a.)

Shell solid, subovate, ventricose, subequilateral, equivalve, white, variously mottled with brown and purple, the markings here and there being small, close together, and of a zigzag character, especially towards the umbones, whilst nearer the centre and towards the base they form several irregular concentric zones or bands, the dorsal area being crossed by similar but more regular bands of a darker colour, whilst a few small triangular white spots occur amongst the brown markings; valves ornamented with between forty and fifty small prominent rounded ribs, the interstices between which, as well as the ribs themselves, are crossed by very fine close-set raised striæ that become somewhat scabrous towards the sides and base; cardinal area small and deep; umbones prominent, incurved anteriorly; interior white stained with purple in front; margins strongly dentate.

Long. 17, alt. 18, lat. 11 lin.

*Hab.* Unknown. Coll. Hanley.

There is a second specimen in the late Mr. Taylor's collection which is larger, and of a lighter colour, with fewer purple markings; whilst the angular white spots are larger and more numerous.

Long. 21, alt. 20, lat.  $13\frac{1}{2}$  lin. Coll. T. L. Taylor.

Externally this fine shell has very much the aspect of a *Cardium*.

7. *PECTUNCULUS AUREOMACULATUS*, n. sp. (Plate XXXV. fig. 7.)

Shell solid, roundly ovate, moderately convex, equilateral, equivalve; white, variously clouded with bright orange patches and spots, and with two or three short flames of the same colour upon the dorsal area; valves with about twenty-five prominent, flattened, nodulous radiating ribs, both the ribs and the interstices between them being crossed by close-set, fine, raised, thread-like striæ; cardinal area very small; umbones moderate; interior of valves white, stained with purple.

Long. 11, alt. 12, lat. 6 lin.

*Hab.* Eastern seas? (*Belcher*). Coll. Hanley.

8. *PECTUNCULUS TAYLORI*, n. sp. (Plate XXXV. fig. 8.)

Shell solid, orbicular, moderately convex, very slightly compressed and subangulate anteriorly; greyish white, tinged with pale fulvous in the centre, and irregularly spotted all over with dark purple short descending flames, smaller and more numerous at the upper part; valves with numerous flattened radiating ribs that become obsolete towards the sides, and sculptured all over with very fine longitudinal close-set grooved lines; umbones central, moderate; cardinal area

very small; interior blackish purple throughout, bordered with a narrow white zone; margins strongly crenate.

Long. 15, alt. 14, lat. 8 lin.

*Hab.* Unknown. Coll. late T. L. Taylor.

9. *PETUNCULUS ORBICULARIS*, n. sp. (Plate XXXV. fig. 9.)

Shell moderately solid, orbicular, depressed, subequilateral, equi-valve, a little compressed anteriorly; white, spotted very sparingly with brown; valves with about thirty rounded radiating ribs that become less prominent towards the sides, and crossed all over with fine concentric wavy lines taking the form of overlapping scabrous laminae towards the base; cardinal area very small; umbones nearly approximate, interior white.

Long 12, alt. 11, lat. 4 lin.

*Hab.* Bass's Straits, Tasmania. Coll. Hanley.

This shell belongs to the same natural group as *P. vitreus*.

10. *PECTUNCULUS NOVA-GUINEENSIS*, n. sp. (Plate XXXV. fig. 10.)

Shell moderately solid, quadrately orbicular, slightly convex, equilateral, equi-valve; white, tinged with pale brown under the umbones; valves sculptured throughout with close-set prominent nodulous ribs, the interstices of which are crossed by extremely fine concentric striae; dorsal margin straight, forming a sharp angle at its junction with the sides, which are flattened; ventral margin arcuate; cardinal area very narrow; umbones small, beaks approximate; interior white; margin broadly crenate.

Long. 16, alt. 15, lat. 7 lin.

*Hab.* New Guinea. Coll. T. L. Taylor.

This remarkable shell belongs to the same group as *P. vitreus* and *P. orbicularis*.

4. On the Anatomy of the African Elephant (*Elephas africanus*, Blum.). By W. A. FORBES, F.Z.S., F.L.S.

[Received April 23, 1879.]

Although the African Elephant was well known, both in their wars and games, to the Romans, till within the last few years hardly any specimens of this species had been seen in Europe since the days of the Roman Empire. With but one exception, as far as I can find out, all our knowledge of the soft structures of the Proboscidea has been, till the present year, derived from examination of the Asiatic species. In his 'Mémoires pour servir à l'histoire naturelle des Animaux'<sup>1</sup>, published in 1734 by the Académie Royale des Sciences of Paris, Claude Perrault describes an African Elephant "du Royaume de Congo," which was presented to the King of France by the King

<sup>1</sup> Tome iii. partie 3, pp. 101-156, pls. 19-24.

of Portugal, and lived from 1668 to 1681 at Versailles, when it died and came into his hands for dissection<sup>1</sup>. In his memoir on this specimen (which extends over fifty pages) the anatomy of most of the soft parts is described, though, as a rule, somewhat briefly, that of the trunk, structure of the nasal organs, and female reproductive organs only being described at greater length. In the following account I shall make reference, where necessary, to Perrault's figures and descriptions under the organs described<sup>2</sup>.

Within the last fifteen years African Elephants have been imported in considerable numbers from Nubia and other parts of the Upper-Nile basin, via Egypt and Trieste into Europe<sup>3</sup>. Altogether considerably more than a hundred must have reached Europe alive; but although some of these must surely, ere now, have fallen victims to the numerous diseases that attack animals in captivity, nothing, as far as I can learn, has been published on the anatomy of any of these animals till the current year. In the first part of the 'Archiv für Naturgeschichte' for the present year (1879), Dr. August von Mojsisovics, of Gratz, has published an article "Zur Kenntniss des afrikanischen Elephanten,"<sup>4</sup> in which he describes certain portions only of the visceral anatomy—namely, the structure of the pharynx, particularly as regards the existence of a "pharyngeal pouch" (hereafter to be alluded to), and of the bronchi, the pancreas and pancreatic duct, and the male genital organs; and of these figures are given on three plates.

During the past winter one of the African Elephants in the possession of the Alexandra Palace Company succumbed to the severity of the weather. By the courtesy of Mr. Jones, the Secretary of the Company, the body was made over to Mr. Bartlett, and was sent up to the Society's Gardens so as to be more easily examined<sup>5</sup>. As our anatomical knowledge of this species is still so rudimentary, I make no hesitation in laying before the Society the following notes on such parts of its anatomy as I examined, the more so as the very considerable differences which occur in the various accounts of those

<sup>1</sup> This animal was a female, and was supposed to be, when it arrived in Paris, about four years old. (It was probably much older.) It was then  $7\frac{1}{2}$  feet high, but during the thirteen years it lived at Versailles only grew 1 foot in height. M. Perrault gives a figure of this specimen on pl. 19 of his memoir; this figure clearly shows the enormous ears characteristic of the African Elephant, but is very defective as regards the hind, and particularly the fore, feet.

<sup>2</sup> Besides this, there are a few short statements on various parts of the anatomy of *E. africanus* in Prof. Flower's lectures on the digestive organs of Mammalia (alluded to below) and in Prof. Macalister's recently published 'Morphology of Vertebrata.' Donitz has described the kidney (Reichert & Du Bois-Reymond's Archiv, 1872, p. 85).

<sup>3</sup> For an account of the introduction of African Elephants into Europe, see a letter by Carl Hagenbeck, the well-known animal-dealer of Hamburg, in 'Land and Water,' March 29, 1879.

<sup>4</sup> *L. c.* pp. 56-92, t. v., vii.

<sup>5</sup> Unfortunately this was not effected till about one week after the death of the animal. This fact, as well as the deaths of several other large animals requiring examination at the same period, made the preliminary dissections rather hurried, and must be an excuse for any errors or omissions in the following descriptions.

who have dissected the Indian species<sup>1</sup> make it advisable to put on record any observations, however fragmentary, for the benefit of future dissectors of either of these huge animals.

The subject of these notes was a young female, which had been in the possession of the Alexandra Company only about eighteen months, but was probably four or five years old at the time of its death. I took the following measurements of the carcass :—

	inches.
From forehead to root of tail (along back) . . . . .	78
Length of tail, from root . . . . .	26½
Height at shoulder (measured to spines of vertebræ over body) . . . . .	58
Circumference of right foot, fore . . . . .	25
Circumference of right foot, hind . . . . .	25
Length of ear, from front of meatus . . . . .	19
Greatest depth . . . . .	27

These measurements show that the ordinarily accepted rule that the height of an Elephant = twice the circumference of its feet very nearly expresses the truth.

As usual in this species, the fore limbs were provided with four, the hind with three nails.

There were eight molars in all in place. In all those of the upper jaw I counted five plates; in those of the lower, there were six in the first, and seven in the second, tooth, of each side.

The most remarkable point observed, when the ribs and other walls of the right side of the body had been removed, was the enormous extent of the thoracic cavity, which extended backwards above till near the sacrum, and the comparatively small part occupied by the abdominal viscera; this was, as far as I could judge, not more than about one third of the whole trunk. As is usually the case with Elephants, there was no fat visible, either in the subcutaneous tissue or in any part of the abdominal cavity.

*Mouth and Tongue.*—The palate, gums, and cheeks were throughout smooth, with no ridges or papillæ, except a few small caruncular projections near the anterior ends of the lower gums.

The tongue (fig. 1, p. 423), as in the Indian species, is small for the size of the animal, much compressed, and rather deep<sup>2</sup>. Its anterior end alone is free for about 2½ inches, and is bent down at an angle with the rest of the organ, and somewhat pointed. The length of the tongue in a straight line was 13½ inches, along the curve 15 inches. The filiform papillæ are extremely fine and small, so that the tongue has an almost velvety touch. At the sides of the anterior part, ex-

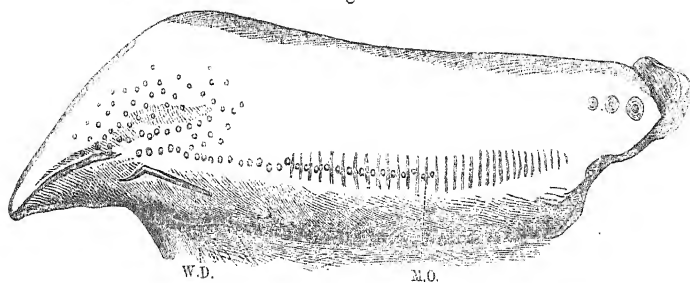
<sup>1</sup> The amount of literature on the anatomy of the Indian Elephant is very considerable. A *résumé* of the principal papers on the subject will be found in Messrs. Miall and Greenwood's 'Anatomy of the Indian Elephant' (pp. 6, 7), recently published, a book which is itself a useful compendium of our present knowledge of Proboscidean anatomy. The myology, however, is described at greater length than any other parts.

<sup>2</sup> Dr. Mojsisovics's figure (*l. c.* Taf. v. fig. 1) is evidently taken from a preserved and distorted specimen, and fails to show accurately the real shape of the tongue when fresh.

tending from near the papilla of Wharton's duct towards the tip, where it becomes obsolete, is a slightly raised longitudinal line. Below this are the openings of a considerable number of small glands, situated, apparently, in the substance of the tongue itself. Above and behind this line are scattered about a few fungiform papillæ; but these get smaller, and ultimately disappear, towards the middle line, and extend but a small distance backwards over the sides of the tongue.

In a line with, and continued back from, this raised line, a single

Fig. 1.



Tongue of the African Elephant (reduced).

W.D. Wharton's duct; M.O. Mayer's organ.

series of rather conspicuous, elevated papillæ, apparently of a glandular nature, is seen. These are continuous behind with "Mayer's organ"<sup>1</sup>, a series of vertical slit-like depressions, the larger of which are each provided with a pair of glandular papillæ, probably connected with mucous glands in the substance of the tongue. I counted about thirty-three slits in this organ, which extends backwards on the sides of the tongue for  $5\frac{1}{4}$  inches, till within about an inch of the circumvallate papillæ. The slits are largest and deepest, and have their glands proportionately larger, a little before the end of the organ: the longest slit is  $\frac{1}{2}$  inch long. In the anterior part of the organ the papillæ of the sides of the tongue stand on the ridges between the slits; but more posteriorly this arrangement disappears. The circumvallate papillæ are situated near the back of the tongue, and nearer the middle line than the glands and papillæ just described. On the right side there are four, on the left three, with indications of a fourth. The posterior ones are considerably the larger ( $\frac{3}{8}$  inch in diameter). The tongue is rounded off and considerably narrowed behind the circumvallate papillæ. In the walls of the pharynx in this region are a few irregular, raised, glandular patches, which attain a considerable size in the middle line.

The tonsils are rather large and deep depressions. In the bottom are seen the openings of many conspicuous and rather large solitary

<sup>1</sup> So called in honour of its discoverer, Dr. C. Mayer (*cf.* Nov. Act. Acad. C. L. vol. xx. p. 746).

glands. The length of each tonsil is about 2 inches. Between the tonsils the root of the tongue is narrowed to about an inch, so that the fauces become extremely small. Between the two posterior pillars a few thin wrinkled folds of mucous membrane run across in front of the epiglottis, forming the "*plica palato-epiglottica*" of Mojsisovics<sup>1</sup>. The epiglottis is short, thick, and evenly rounded. I failed to detect any "pharyngeal pouch," such as that described by Dr. Watson<sup>2</sup>, or even to recognize the "leicht zu überschende, seichte Grube," which Dr. Mojsisovics (*l. c.* p. 60) found as its sole representative in the animal he examined. In other respects my observations on the pharynx closely agree with the descriptions and figure (*l. c.* Taf. v. fig. 1) of the last-named naturalist, as also with the description of the pharynx by Messrs. Miall and Greenwood in the Indian species (*l. c.* p. 52). The former, however, does not apparently recognize the subdivision of his "inner" pharyngeal sac (*l. c.* Taf. v. fig. 1, I) into two by a vertical fold of mucous membrane, which runs from the transverse fold in front backwards to a level with the hinder part of the larynx, and there, after getting deeper, terminates, sending off a fold to the laryngeal mass on one side and to the *palato-pharyngeus* on the other. Such an arrangement is clearly described by Messrs. Miall and Greenwood (*l. c.* p. 52) in their subject; but they mention only a single gland in each of the inner chambers, whereas I find that there are several glands on the *outer* walls only of each of the two innermost chambers of each side. The external chamber on each side is free from glands, as noticed by Dr. Mojsisovics (*l. c.* p. 62).

The relations of the various parts of the hyoid arches to each other, and to the muscles in connexion with them, exactly agree with those that obtain in the Indian species, as first pointed out by Prof. Garrod<sup>3</sup>. Between the digastric and the stylo-pharyngeus pass the vessels supplying the thyroid glands.

*Salivary Glands.*—The parotid gland is large<sup>4</sup>; Stenson's duct opens in the cheek in the usual position.

The submaxillary gland is small and oval; it measured 2 inches long by  $\frac{3}{4}$  inch deep and  $\frac{1}{8}$  inch thick. Wharton's duct, 8 inches long, opens on each side on a single linear papilla beneath the tongue on the *frænum linguæ*, about 3 inches from the tip.

The sublingual is 5 inches long, 1 inch wide, and  $\frac{1}{8}$  inch thick. It opens by many ducts beneath the tongue.

Besides the above glands, which are usually present in Mammalia, there is a large, more superficially situated, gland that lies in front of the angle of jaw on its inner side. This gland is much lobulated, is about 8 inches long, 1 inch wide at its greatest width, and  $\frac{1}{2}$  inch thick. It opens by many ducts, some situated on raised papillæ, in the cheek<sup>5</sup>. It probably corresponds to the molar glands found in

<sup>1</sup> *L. c.* p. 62, Taf. v. fig. 1, *p. e.*

<sup>2</sup> *Journ. Anat. Phys.* viii. 1873, p. 91.

<sup>3</sup> *P. Z. S.* 1875, p. 365, and figure.

<sup>4</sup> This was unfortunately damaged in removing the brain; consequently I can give no details.

<sup>5</sup> My friend Mr. W. Ottley, of University College, was kind enough to help me by dissecting out and measuring these glands.

many animals, particularly Rodents. Dr. Watson and Messrs. Miall and Greenwood only found the parotid gland present in their examples<sup>1</sup>.

*Alimentary Canal.*—The œsophagus is of but small calibre; at its entrance into the stomach, when cut open and stretched out, it measures 4 inches.

The stomach in shape resembles that of the Indian Elephant as figured by Camper and others. Its long axis lies almost vertically in the animal, with the cardiac end directed upwards, the pyloric being downwards. In a straight line it measures 26 inches from the cardiac to pyloric ends; from the extremity of the cul-de-sac, along the greater curvature to the pylorus,  $35\frac{1}{2}$  inches; along the lower curvature  $18\frac{1}{2}$  inches. Its greatest depth is 9 inches, at the pylorus only  $3\frac{1}{2}$ . The rounded cul-de-sac, to the left of the entrance of the œsophagus, is  $9\frac{1}{4}$  inches long by  $7\frac{3}{4}$  deep. Perrault gives  $3\frac{1}{2}$  feet by 14 inches as the dimensions of the stomach in his adult animal. In his figure of this viscus (*l. c.* pl. 20) the cardiac cul-de-sac is represented as nearly conical; and in other respects his representation is not good.

The mucous membrane of the cardiac cul-de-sac is raised up into about fifteen thick zonary folds, which are arranged with considerable regularity in that part of the stomach, but decrease both in size and regularity as they approach the pyloric part; so that the posterior third of the inner part of the stomach is almost smooth, with only slight and irregularly disposed rugæ<sup>2</sup>. The folds are very expansible; but in the ordinary state none exceeds about 1 inch in depth. The greater part are continuous all round the stomach; but others blend with adjacent folds; so that it is not possible to count the exact number with any great accuracy. The mucous membrane of the œsophagus is sharply marked off from that of the stomach: here it is covered by numerous short slit-like depressions (probably mucous canals) in the anterior two thirds; but in the posterior third these disappear or become obsolete.

About  $4\frac{1}{2}$  inches from the œsophagus, in the middle line of the lesser curvature, is a small, blunt, slightly elevated, circular prominence, pitted in the centre, of  $\frac{1}{6}$  inch diameter, which is probably glandular in nature. Prof. Garrod, in his MS. notes, records small glands, apparently formed by the aggregation of several of these, as occurring in a similar position in the Indian species. The pylorus has no distinct valve.

The length of the small intestine was 27 feet 4 inches, of the very

<sup>1</sup> Mr. Bartlett tells me that in both sexes of the African Elephant the peculiar temporal gland, which is found in the Indian species, and opens externally between the eye and ear, is certainly present. I omitted, unfortunately, to look for it.

<sup>2</sup> Mayer's figure (Nov. Act. Acad. C. L. vol. xxii. pt. 1, pl. iv. fig. 3, 1847) of the stomach of the Indian species does not sufficiently indicate the regularly zonary nature of these folds; in that of Sir James Emerson Tennent ('The Wild Elephant,' p. 59 [1867]), on the other hand, these folds are represented as much too regular and sharply defined.

Fig. 2.

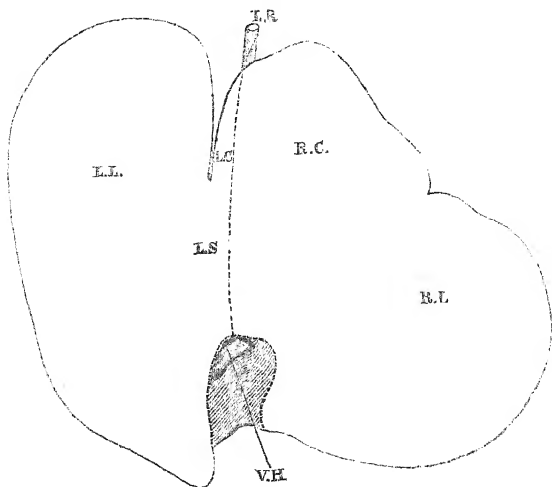
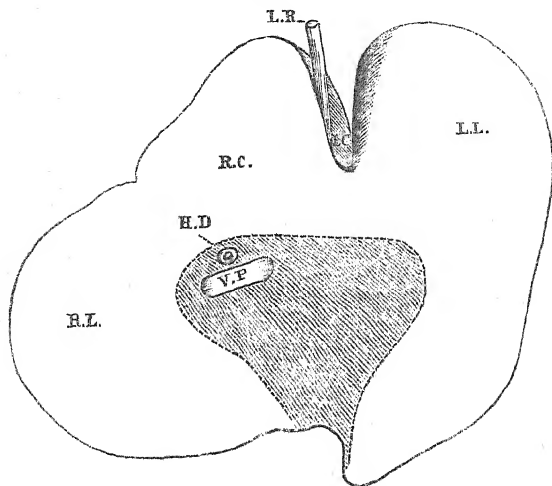
View of liver of *E. indicus*, from above.

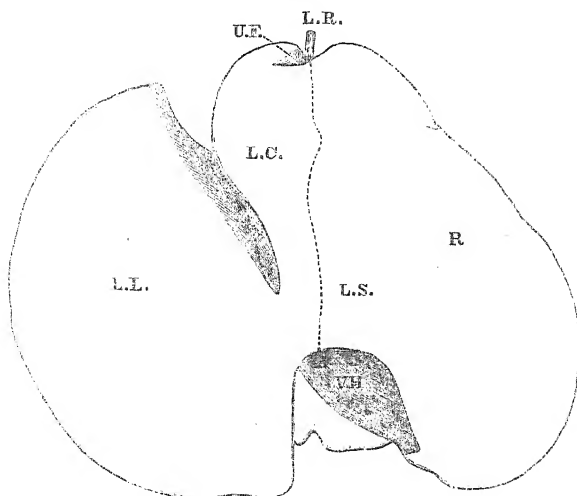
Fig. 4.

View of liver of *E. indicus*, from below.

All the figures much reduced. Figs. 2 and 4 from drawings by Prof. Garrod.  
 L.L. Left lateral. L.C. Left central. R.C. Right central. R.L. Right lateral.  
 R. Right lobe of liver. V.H. Hepatic vein. V.P. Vena Portae. H.D.

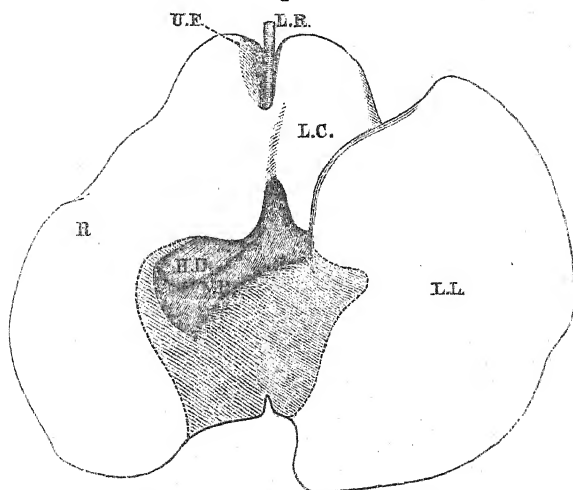


Fig. 3.



View of liver of *E. africanus*, from above.

Fig. 5.



View of liver of *E. africanus*, from below.

Hepatic duct. L.R. Round ligament. L.S. Suspensory ligament.  
U.F. Umbilical fissure.

capacious large intestine 16 feet<sup>1</sup>. The latter was arranged on a mesocolon, just as in Prof. Flower's description<sup>2</sup> of the Indian species. The cæcum was large and sacculated, forming a broad and blunt cone 22 inches long. It lay on the right side, near the middle line of the belly, pointing forwards. Prof. Flower (*l. c.*) found it in a similar position on the left side in a fœtal African Elephant.

The mucous membrane of the duodenum is raised up into irregularly transverse, almost dendritic, closely set, slightly elevated rugæ. These continue throughout the whole length of the small intestine, but towards the ileum become arranged more longitudinally. For about 6 inches before its opening into the large intestine the ileum is surrounded internally by large, elevated, pitted glandular patches, caused by a breaking-up and intersection of the rugæ, and somewhat resembling an immensely broadened Peyer's patch. For about the last 1½ inch of the ileum these patches disappear, leaving the mucous membrane only slightly longitudinally wrinkled. The longest of these elevated patches is about 1½ inch long. The ileo-cæcal valve is only represented by the prominent edges of the ileum, which project into the colon in a ring-like manner. The ileum is here, when cut up and laid flat, 4½ inches across. The mucous membrane of both colon and cæcum is smooth, with only slight irregular folds.

*Liver*.—All authors from Perrault onwards have described the Elephant's liver as being composed of two lobes. In his lectures on the organs of digestion of the Mammalia, published some years since in the 'Medical Times and Gazette,' Prof. Flower (*l. c.* Oct. 5, 1872, p. 372), thus describes this organ (presumably in the Indian form):—"The liver is small for the size of the animal and of simple form, being only divided by an umbilical fissure into two lobes, of which the right is the larger." But this statement does not quite accurately describe the facts of the case. As may be seen from the annexed figures (figs. 2 and 4, p. 426) taken from drawings by Prof. Garrod (who was the first to point this out to me), of the liver of *Elephas indicus*, the suspensory ligament runs not in, but a little to the right of, the large notch which has been taken for the umbilical fissure by most authors, and is there connected, as usual, by a thin membranous expansion with the round ligament. In this species there is no umbilical notch visible<sup>3</sup>.

In *Elephas africanus* (figs. 3 and 5, p. 427), the suspensory ligament lies still further to the right of the large notch, and there is a conspicuous umbilical notch (about 2½ inches deep), visible on both surfaces of the liver.

From a comparison of the two livers it becomes clear that in both species the liver consists of *three* lobes, a right lobe (slightly divided

<sup>1</sup> Perrault gives 38 feet and 22 feet as the lengths of the small and large intestines respectively in his specimen; so that the ratios of the two measurements are nearly the same. The cæcum measured 1½ foot.

<sup>2</sup> Med. Times and Gazette, Oct. 5, 1872, p. 372.

<sup>3</sup> In a liver of *E. indicus*, in the Royal College of Surgeons (810 F) there is visible, at the place where the round ligament is lost in the substance of the liver, a narrow fissure, which runs obliquely for some way towards the margin, but does not reach it; so that there is no notch formed.

in both species), a left central lobe (extremely small in *E. indicus*, but clearly marked off in *E. africanus*), and a left lateral lobe, of large size in both species. In *E. indicus*, as may be seen from the figures, the right margin of the liver is slightly notched, apparently marking out the distinction of right central and lateral lobes: in *E. africanus*, however, there are two such notches, both very shallow and superficial. In both species there is a large area behind the transverse fissure on the under surface of the liver bare of peritoneal covering (indicated by the portion within the dotted lines in figs. 4 and 5). The angulated line of attachment of the suspensory ligament in this species will also be noticed (fig. 3).

The liver in my specimen weighed 13 lb. 5 oz.: its greatest length transversely was  $20\frac{1}{4}$  inches, the greatest breadth (from behind forwards) 16 inches. In Perrault's example it measured  $3\frac{1}{2}$  ft.  $\times$   $2\frac{1}{2}$  ft. His figure (pl. 20) is not at all like my specimen; nor is Mayer's drawing (*l. c.* pl. v. fig. 1—which, by the way, clearly shows the above-described relations of the suspensory ligament to the large median notch) of that of *E. indicus* very satisfactory.

As in the Indian species, there is no gall-bladder; but the hepatic duct has its epithelium reticulated at the lower end, and is very spacious, measuring 9 inches long by  $1\frac{7}{8}$  broad.

The pancreas is a lobulated, elongated gland, 17 inches long. It opens by a single, wide and short duct (one inch long) into the hepatic duct at the junction of the latter with the wall of the duodenum, through which the common duct is continued for  $3\frac{1}{2}$  inches. The common duct is provided with distinct circular valve-like folds, exactly as shown by Camper (*conf.* also Dr. Mojsisovics's figure, *l. c.* Taf. vi.), and opens on a slightly raised nipple-like projection on the sides of the duodenum; its aperture is about  $\frac{1}{8}$  inch broad. Like Perrault and Dr. Mojsisovics, I saw nothing of any secondary pancreatic duct opening into the intestine separately from the hepato-pancreatic one, such as has been described by many naturalists (*conf.* Mojsisovics, *l. c.* pp. 72, 75) in *E. indicus*.

*Spleen*.—This viscus was of a very long irregular oval, with the attached margin nearly straight, the other somewhat irregular. It measured  $23\frac{1}{2}$  inches by  $5\frac{1}{4}$  across<sup>1</sup>: it was flattened and thin, and of a slaty-grey colour.

*Thyroid Gland*.—This consists of two circular cake-like lobes of considerable consistency, united by a short isthmus. Each lobe measures about  $4\frac{1}{2}$  inches in diameter.

*Heart*.—The ventricles were not separated at the apex by any deep groove, such as is noticed by Mayer (*l. c.* p. 44) and Messrs. Miall and Greenwood (*l. c.* p. 68) in *E. indicus*. This separation of the ventricles is probably an individual feature, as neither Hunter ('Observations,' ii. p. 172) nor Vulpian and Philipeaux (as quoted by Miall and Greenwood, *l. s. c.*) observed it. The fossa ovalis was very deep, admitting the first two joints of the index finger. Hunter also (*l. c.*) found the remains of the foramen ovale distinct. The ductus arteriosus was of the size of a quill pen, and about one inch long,

<sup>1</sup> Perrault gives 3 feet by 7 inches.

but quite impermeable. The aorta gives off an innominate artery, which is only an inch long and then divides into right brachial and right and left carotids. The left brachial is given off immediately after the innominate. This agrees with the descriptions of *E. indicus* as given by Hunter, Owen, Vulpian and Philipeaux, Watson, and Miall and Greenwood. On the other hand, Cuvier and Mayer found three trunks, namely two brachials and a common carotid. I found no "*arteria thyroidea inferior simplex*" coming off from the point of division of the two carotids, such as is figured by Mayer (*l. c.* pl. 11. fig. 3) and Watson (*Journ. Anat. & Phys.* vi. pl. vi. fig. 1). The weight of the heart and great vessels, cut short and cleaned of blood, was 7 lb. There was no *os cordis*; and the same was the case in Perrault's specimen; nor is any such bone recorded in *E. indicus* by recent anatomists.

*Respiratory System.*—The lungs were very simple in form, each lung being undivided and bluntly triangular in general outline, the left being shorter and broader. In the undistended state they measured as follows:—Right lung 23 inches long by 12 broad, left 21 inches by 14. I found no accessory lobe on the right side, such as has been observed by some anatomists in *E. indicus*. There is no extra bronchus.

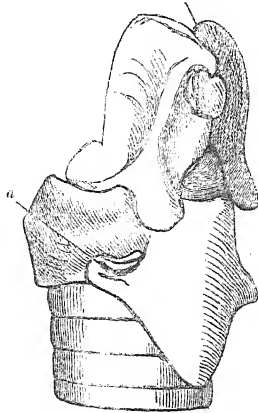
The trachea is short, measuring about a foot in length, and not quite two inches in external diameter. It is composed of 28 rings, which are nearly complete, leaving hardly any space behind between their ends. They vary considerably in size in different parts of their circumference. The first three rings, as in *E. indicus*, are truncated obliquely behind, the space so formed being covered in by the body of the cricoid cartilage.

The larynx (fig. 6, p. 431) is of considerable size. The epiglottis, when covered by its soft parts, is short, thick, and rounded. The thyroid consists of two rhomboidal wings, 4 inches long, and  $3\frac{1}{4}$  deep, which are united in front superiorly for about one inch, the deep and narrow notch left between the remaining part of the wings being filled up by connective tissue. The superior cornua are short and scarcely project. The posterior are about one inch long, and are directed downwards and forwards in close proximity with the body of the thyroid cartilage, to which they are attached by connective tissue. The postero-inferior angle of the thyroid cartilage also develops an articular facet; and this is enclosed with that of the posterior cornu, in the common capsule of the crico-thyroid articulation. The cricoid (see fig. 6) is of the usual type. Its anterior part is 1 inch deep, the posterior (somewhat pentagonal) part 2 inches. The processes for articulation with the thyroid stand out in a step-like way, and are more or less clearly divided into two facets, corresponding to the double articulating surfaces of the thyroid.

The arytaenoids (see fig. 6) are vertically elongated. Each measures about  $2\frac{1}{2}$  inches long by  $1\frac{1}{2}$  broad. They have a conspicuous, vertically directed, raised spine-like process, and a large notch behind the supero-posterior angle. The cartilage of each side articulates with its fellow both above and below this notch. The *processus vocalis* is short and blunt. The true vocal cords are well-marked

and thick elastic folds,  $2\frac{3}{4}$  inches long. The false vocal cords hardly exist. Between the two is a slight laryngeal pouch, which extends backwards a little way, as in the Indian Elephant (Miall and Greenwood, *l. c.* p. 76). The muscles of the larynx closely agree with those described by the last-named anatomists. The superior

Fig. 6.



Larynx of African Elephant (about half nat. size) viewed somewhat obliquely from behind. The thyroid cartilage has been removed. *a*, points to the double facet of the crico-thyroid articulation.

fibres of the *crico-arytænoideus posticus* run transversely across in the interval left above by the more inferior, diverging fibres of that muscle.

*Urino-genital System.*—The kidneys lie in the usual position. Their shape is an irregular oval. The following details refer to the single kidney (right) which I preserved for further examination. The length is 10 inches, the breadth about 6. The hilus is not marginal, but lies about 1 inch from the side; its length is  $4\frac{1}{2}$  inches. The weight of the kidney is 3 lb. The kidney is indistinctly divided into eight lobes, which are of varying size and shape; one lobe is scarcely visible on the hilar surface. These lobes are essentially distinct, each consisting of a cortical and medullary part, not, however, very clearly marked off from each other. The Malpighian corpuscles are clearly visible. Perrault's figure of the kidney (*l. c.* pl. 20) is too elongated and shows no lobes. The number of lobes in the kidney of *E. indicus* has been variously stated at from two to eight or nine. The suprarenal bodies resemble those of the Indian species.

The ureters open into the bladder by semilunar slits about 2 inches from its orifice. The neck of the bladder is short and thick.

The female organs are formed on precisely the same type as those of the Indian species<sup>1</sup>, consisting of a long urino-genital passage ("the common vagina, which is common to the urine and penis" of Hunter),

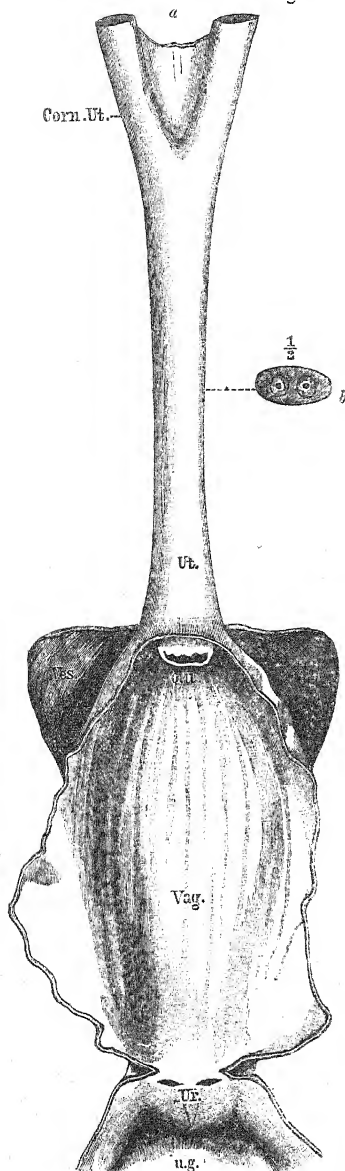
<sup>1</sup> Cf. Hunter, 'Observations,' &c. ii. p. 175; Mayer, *l. c.* p. 37, t. vi.; Owen, *Anat. Vert.* iii. p. 692; Miall and Greenwood, *l. c.* p. 62. pl. iv.

a secondary vagina ("the proper, or rather uncommon, vagina, which the penis cannot enter"), a corpus uteri, with two horns, and Fallopian tubes and ovaries. The ovaries lie in pouches of peritoneum, attached by peritoneal folds to the kidneys: the one I examined resembled in form those figured by Mayer in the Indian species. It was a little over an inch long, and generally smooth, with only a few small lobular processes and erupted Graafian follicles near the line of attachment to the peritoneal pouch. The latter is continuous with the opening of the Fallopian tube, and is of considerable size: its walls are thickened by muscular fibres, prolonged into it apparently from the Fallopian tubes. The tubes are of small calibre, of the size of a crow-quill, about 3 or 4 inches long, and, after a tortuous course, open into the cornua uteri at the side of that tube, as well shown in Mayer's figure (*l. c.* pl. vi. fig. 2).

The two cornua are about  $\frac{1}{2}$  inch across at their commencement, and have very thick muscular and elastic walls. For the last  $4\frac{1}{2}$  inches of the course of the cornua they are united together (as seen in fig. 7) into a single tube, which is about 1 inch across at the point of junction. This tube is externally single; but nevertheless, on cutting it across, the two comparatively small cavities of the cornua are seen lying beside one another, but separated by a considerable septum. Without any difference in the external calibre of the tube, the two cornua open together into a common cavity  $2\frac{1}{2}$  inches long, which is the true "corpus uteri." At their opening each cornu admits a large knitting-needle. There is no valve of any kind at the opening. Both cornua and corpus are lined by smooth, longitudinally plaited, mucous membrane. A similar arrangement to that here described would seem to be indicated by Perrault's description:—"Ces cornes, au lieu de s'écarter et de se séparer comme elles font ordinairement, étoient jointes l'une contre l'autre, montant jusqu'au hauteur d'un pied, et n'étant séparés que par une cloison mitoyenne; ensuite elles se séparent en deux branches." In his example (nearly or quite adult) each horn measured 2 feet 8 inches, and was  $1\frac{1}{2}$  inch across at the commencement. The female genital organs he pictures on pl. 21: this shows the conjoined cornua, which are separate till near their end, as seen in section.

The next part of the genital organs is the dilated, sac-like, "secondary," or "uncommon," vagina. This is about  $5\frac{3}{4}$  inches long, and is lined by smooth mucous membrane, with slightly raised longitudinal folds, running from the opening into it of the corpus uteri. This opening is small, only admitting the tip of the little finger, and is provided behind with an irregularly bilobed thick valve of mucous membrane. This constriction and valve undoubtedly represent the "os uteri." Perrault describes this "secondary vagina" as the "corps ovale;" in his specimen it measured 18 inches by 6 inches, and was smooth and polished within. It is well shown in his figure (*l. c.* pl. 21); but the "valvule frangée aux embouchures des cornes de la matrice" is not quite like the valve in my specimen. In the text he says, "Deux trous au dedans...étoient entourés par un appendice de la membrane interne...en manière de la frange ou de pavillon." It would appear, then, that in his animal there was no "corpus uteri," such as that

Fig. 7.

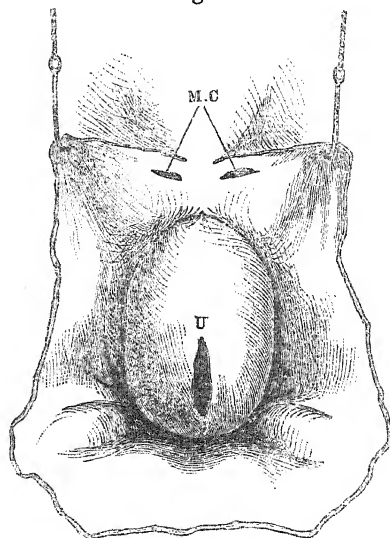


*a.* Uterus and vagina of African Elephant (about half natural size), viewed from behind. The vagina (*Vag.*) and urino-genital canal (*u.g.*) have been laid open from behind. (*Corn. ut.*) Cornua uteri cut short above. *Ut.* True uterus, formed by the coalescence of the two cornua, but not marked off externally from the conjoined cornua by any constriction. *o.u.* Above this is the valve-like structure corresponding to the *Os uteri*. *Ur.* Prominence on which the urethra opens; above it are seen the Malpighian canals; below the letters is the papilla-like free point (*vide* fig. 8). *Ves.* Bladder.

*b.* Section of the conjoined uterine cornua, half the natural size, to show the distinctness of the two tubes internally at this point.

which exists in mine, but that the two cornua opened separately into the "corps ovale" (=secondary vagina). Mayer apparently (*l. c.* pl. 6. p. 38) found a similar arrangement in *E. indicus*. Hunter, Owen, and Miall and Greenwood all indicate an arrangement like that which obtained in mine<sup>1</sup>.

Fig. 8.



Opening of urethra (U) into the urino-genital canal, about natural size (somewhat diagrammatic). The walls of the urino-genital canal are cut close round the urethral eminence. M.C. Malpighian canals; below (anterior to) the letters is seen the constriction separating the vagina from the urino-genital canal; on the top of the urethral eminence is seen the small free point; below it is the cul-de-sac of the urino-genital canal.

N.B. In the natural position the lower parts of the figure are anterior, the upper parts posterior.

The secondary vagina, which lies behind the neck of the bladder; is separated by a constriction, leaving only a very small opening, from the urino-genital chamber, which is marked off by the livid blue colour of its mucous membrane from the parts already described. On each side of this median constriction lies a small obliquely-placed slit, about  $\frac{1}{4}$  inch long, and admitting a probe for about the same distance into the small sacs (canals of Malpighi), of which they are the openings. Exactly the same arrangement occurs in the Indian

<sup>1</sup> In a specimen (2776 A) in the College of Surgeons of the uterus &c. of *E. indicus*, the "corpus uteri" is very much more capacious than in my (young) specimen, is about 7 inches long, and is only separated off from the "secondary vagina" by a prominent zonary fold of mucous membrane. The calibres of these two chambers are about the same.



Elephant. There is no trace of any hymen-like organ dividing this median constriction into two, such as noticed by Miall and Greenwood (*l. c.* pl. iv. fig. 3, *h*). This point about corresponds with the entrance of the genital organs into the pelvis.

Perrault describes and figures (pl. 22) in his example two "valves sigmoïdes," which guarded the "orifice interne de la matrice," and also a "rebord qui s'avançoit au-devant du col de la matrice de la longueur d'environ deux pouces." What the two sigmoid valves are I do not see, as in his figure he indicates the two Malpighian canals as well. The "rebord" probably corresponds to the tumid rounded eminence (fig. 8, p. 434) about 1 inch long, terminating above and behind in a little point, on which the urethra opens by a somewhat narrow aperture, just below and in front of the opening into the secondary vagina<sup>1</sup>. In front of this eminence the urino-genital canal, as the remaining part of these organs may be called, is produced into a small cul-de-sac. The total length of this canal is about 20 inches<sup>2</sup>; the clitoris, which resembles the same organ in *E. indicus*, and which has similar relations to the urino-genital canal, is about 15 inches from the attachment of its crura to the pelvis to its extremity. The glans clitoridis is about 2 inches long, rounded anteriorly, flattened and grooved posteriorly, where it is in contact with the urino-genital canal. There is a well-marked preputial-like reversion of the integuments round the glans, as in *E. indicus*.

The brain was removed with but little injury; but its description must be deferred till some future occasion.

As will be seen from the foregoing account, but little difference, on the whole, exists in the visceral anatomy of the only two remaining species of Proboscideans. What differences there are chiefly relate to the stomach, liver, and female organs; but, till more specimens of *E. africanus* have been dissected, it is impossible to say how many of the points above noticed are due to individual peculiarities or those of age and the like. There appears, therefore, little ground, from an anatomical point of view, to separate *Loxodon* as a genus from *Euelephas*.

<sup>1</sup> This raised part, on which is the opening of the urethra, is probably identical with the "Klappe" figured by Mayer (*l. c.* pl. vi. fig. 1) as existing between the two orifices of the bladder and vagina.

<sup>2</sup> In Perrault's adult example the length was 3 feet 6 inches.

5. Note on the Number of Anal Plates in *Echinocidaris*. By  
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Zoological Department, British Museum, F.Z.S.

[Received April 23, 1879.]

If any one anatomical fact was thought to be certain with regard to the Echini, it was the presence, as a constant mark of differentiation, of four plates and four plates only in the anal region of the species of the genus *Echinocidaris*. Thus not only does the diagnosis of Desmoulins (1835) include the words "pièces terminales anales au nombre de quatre seulement," and that of Gray (1835, *Arbacia*) "anus valvis quatuor spiniferis tectus," but the definition given by Prof. Alex. Agassiz<sup>1</sup> of the family Arbaciadæ states among other characters that "the anal system consists of only four large triangular plates." Prof. Troschel, in an elaborate article on the genus<sup>2</sup>, exhibits not the slightest doubt as to the validity of this character, and expresses himself in the following words:—"Das Periproct ist durch vier dreieckige Platten geschlossen"<sup>3</sup>. In a later publication than his 'Revision' (in the Zoological Results of the Hassler Expedition<sup>4</sup>), Prof. Alex. Agassiz sounds the first inharmonious note. Troschel (so certain was he of the great value of these four anal plates) had, on account of the presence of five anal plates in some *Parasalenia*, separated them from the Echinocidaridæ, in which family, as he imagined, Agassiz had placed them. Roused, apparently, by his criticism, the American naturalist took the opportunity afforded him by the arrival of additional specimens of *E. dufresnii* to point out "that it is quite remarkable that in the few specimens existing in the British Museum and in our collection, there should be two specimens having five anal plates instead of the normal number of four in the other species of the genus"<sup>5</sup>. As there are two specimens in the British-Museum collection in which there are five anal plates, and as, on the other hand, the collection made by Dr. Cunningham, "of quite a number of specimens," passed, as Prof. Agassiz informs us, through his hands before the 'Revision' was published, and that without the peculiarity in question being there noticed, it would be possible to read the (not too perspicuous) sentence which I have just quoted in any one of the three following ways:—

(1) Both the specimens referred to are in the British Museum;  
(2) neither specimen is in the British Museum; or (3) there is, to Prof. Agassiz's knowledge, one specimen in each of the collections mentioned. I am inclined to think that this last construction is the one which the words were meant to bear; and I am supported in this belief by the difference between the two specimens from Dr. Cun-

<sup>1</sup> Revision of the Echini, p. 399 (1872-1874).

<sup>2</sup> Archiv für Naturgeschichte, xxxviii. p. 293, xxxix. p. 308.

<sup>3</sup> Op. cit. xxxviii. p. 298.

<sup>4</sup> Illustrated Catalogue, Mus. Comp. Zool. viii. p. 6 (1874).

<sup>5</sup> Cat. M. C. Z. viii. i. p. 6.

ningham's collection, one of which bears evident marks of having undergone examination.

It is obvious that the question could not be left in this state. It seemed now necessary to see how far the number of anal plates varied in various species, and whether the character in question had not been definitely attained to by this species only, or whether in other species also there was at times a return to the possession of the large number of plates which are so commonly found in nearly all Echinida.

With this object in view, I have examined all the specimens of the genus *Echinocidaris* in the Museum; and the accompanying Table will, I think, show that the work was worth the doing. In addition to the nine specimens here noted, there is a specimen of *E. pustulosa* ("*grandinosa*") in which only three plates are present: one of these is very small; and it is also evident that two have dropped away. I have been enabled to examine some fifty-four specimens in which the anal plates are preserved; and the "number of specimens" in the following list gives the number of specimens in the set from a given locality or collection.

Name of species.	Locality.	No. of specimens.	Varieties.
<i>E. dufresnii</i> .....	Port Otway.	5	One with five anal plates.
" .....	Shell Bay.	3	One with five "
" .....	Sandy Point.	1	One with three "
" .....	Otter Islands.	1	One with three "
<i>E. stellata</i> .....	?	1	One with five "
<i>E. nigra</i> .....	Coquimbo.	1	One with five "
" (or sp. closely allied)?		10	One with six "
" .....	?	1	One with ten "
" .....	?	8	One with three "

In the three specimens of *E. dufresnii* and the one specimen of *E. pustulosa* (juv.) received from the 'Challenger' Expedition, the number of anal plates is normal.

With regard to this Table we have to note (1) the reduction of the plates below the normal number, as obtaining in three specimens not all of the same species; (2) that the specimen of *E. pustulosa* (*grandinosa*) already referred to, and that of *E. nigra* from Coquimbo prevent our limiting the possession of five plates to *E. dufresnii*; while the specimens with six and with ten plates are most remarkable, inasmuch as in both cases there are two plates which retain the proper Echinocidarid character. No normal specimen seems yet to have been observed so young as not to have attained its four anal plates. In conclusion I think it well to abstain for the present from any speculation on the matter, and shall be satisfied if I direct the attention of echinologists to the point in question.

May 20, 1879.

Prof. W. H. Flower, LL.D., F.R.S., President, in the Chair.

Mr. Slater made some remarks on the animals and other objects observed in the Zoological Gardens of Rotterdam, Amsterdam, Cologne, Frankfort, and Antwerp, which he had just visited.

At Rotterdam Mr. Slater had examined with great interest an example of his recently described *Plectropterus niger* (P. Z. S. 1877, p. 47, pl. vii.), being the third known individual of this peculiar species. This bird had been received from Zanzibar from Hr. H. Jansen, and so confirmed the habitat of this species as spoken of by Mr. Trimen (P. Z. S. 1879, p. 5).

At Amsterdam the series of Parrots of the genus *Chrysotis* lately assembled by Mr. Westerman had been studied with much interest. It contained an example of the recently described *Chrysotis bodini* of Finsch (P. Z. S. 1873, p. 569, pl. xlix.), being the second known specimen of this near ally of *C. festiva*; also two examples of the rare *C. erythrura*, Kuhl, the first that had ever come under Mr. Slater's observation. At the time he wrote his 'Papageien' Dr. Finsch was not autoptically acquainted with this fine species.

Among the Antelopes in the Zoological Garden at Cologne was a fine young female of *Hippotragus equinus*.

In the new and excellently arranged garden at Frankfort-on-the-Main Mr. Slater had been much interested with the construction of the Aquarium, finished about two years ago, and now in excellent working order. The motive power used for raising the water was a gas-engine. The sea-water was entirely artificial, but was very clear; and the fishes, both from the Mediterranean and North Sea, appeared to be in excellent health.

At Antwerp Mr. Slater's attention had been principally devoted to the New Lion-house just completed. Its dimensions were slightly in excess of that of the Society, and the out-door cages and in-door cages were arranged on the same side, facing south; otherwise the principles of the two buildings were nearly similar, although the building at Antwerp was much more highly ornamented.

Prof. Owen, C.B., F.R.S., read a memoir in which an account was given of a portion of a mandible and teeth of a large extinct Kangaroo of the genus *Palorchestes*, recently discovered in the ancient fluviatile drift of Queensland, which was proposed to be called *P. crassus*.

This paper will be published entire in the Society's 'Transactions.'

The following papers were read:—

1. Descriptions of New Species of Coleoptera of the Family  
Halticidæ. By MARTIN JACOBY.

[Received April 28, 1879.]

Genus NOTOZONA, Clark.

1. NOTOZONA BIVITTATA, sp. nov.

Ovate, elongate, very convex, black; head and thorax rufous; elytra black, striate-punctate, each elytron with a longitudinal stripe from base to apex, near the lateral margins, bright flavous.

Length  $3\frac{1}{2}$  lines.

Head convex, minutely punctured, vertex smooth, labrum and antennæ flavous. Thorax about three times as broad as long, sides rounded, anterior angles produced into a subacute tubercle, hinder angles obtuse; posterior margin not lobed in the middle; upper surface with a deep round fovea near each side, distinctly and rather closely punctured throughout. Elytra impressed, each with eleven rows of punctures, the intervals also minutely punctured, shining black, each elytron with a flavous band from the base to the apex, running parallel with the lateral margin, and curving round with it towards the suture, near the apex. Underside (with the exception of the sides of the breast, the coxæ of the legs, and the thighs, which are flavous), black; tibiæ and tarsi black.

*Hab.* Peru?

Genus DISONYCHA.

2. DISONYCHA ERICHSONI, sp. nov.

Elongate, parallel, black, shining; the last three joints of the antennæ, the abdomen, and three transverse narrow bands across the elytra yellowish white.

Length 3 lines.

Head rather depressed, black, shining, a short elongate fovea near each eye. Antennæ longer than half the body, the second joint short, the third of double the length, the fourth longer than the third; black, with the exception of the last three joints, which are flavous testaceous. Thorax rather convex, the angles thickened, the anterior ones slightly produced outwards, an obsolete transverse depression extends near the base across the disk; latter impunctate, shining black, the angles obscure testaceous; scutellum elongate triangular, black. Elytra broader than the thorax, rather convex, narrowed near the apex, the latter rounded, surface very minutely punctured, shining black; the base, a narrow band immediately below the middle, connected with the base anteriorly and laterally, and a band near the apex yellowish-white. Underside and legs black, abdomen flavous.

*Hab.* Peru.

Three specimens in my collection.

3. *DISONYCHA TRISTIS*, sp. nov.

Ovate, convex, black, opaque. Thorax testaceous, with five piceous spots; elytra black, opaque, alutaceous, with two very narrow longitudinal flavous vittæ, joined at the apex.

Length 3 lines.

Head deeply and very closely punctate, with a transverse fovea between the eyes, and a short longitudinal raised elevation towards the vertex; antennæ with the fourth joint longer than the third, elongate to the fourth joint, from there with distinctly shorter and thicker joints, black, base and underside of first three joints testaceous. Thorax rather narrow, transverse, base sinuate each side, surface finely and irregularly punctate, testaceous, four transversely placed spots near the anterior margin and another near the base piceous; scutellum opaque; elytra a little widened posteriorly, rather convex, finely alutaceous, black, without any gloss, with two very narrow longitudinal vittæ, of which one is placed near the sutural, the other near the lateral margin, and which are joined near the apex, of a flavous testaceous colour. Below and legs black, also opaque.

*Hab.* Brazil.

This species may be distinguished from others similarly marked by the coarse punctuation of the head, the opaque colour of the elytra, and the very narrow vittæ of the latter.

Genus *NEPHRICA*, Harold.4. *NEPHRICA MARGINATA*, sp. nov.

Elongate-ovate; black, very shining. Head, thorax, and lateral margins of the elytra, as well as the apex of latter, light testaceous.

Length  $3\frac{3}{4}$ –4 lines.

Head impunctate, eyes moderately deep, emarginate, kidney-shaped; base of labrum and the palpi dark piceous; antennæ robust, third and fourth joints equal, the two basal joints stained below with flavous, the rest black. Thorax narrow, its sides broadly margined, the anterior angles convex, obtusely rounded outwards, basal margin rather deeply concave at either side, surface irregularly depressed, with a short oblique groove near the posterior angles; disk almost impunctate, with a row of deeper punctures running parallel with the lateral margins. Scutellum smooth, broad, apex rounded; elytra rather depressed below the base, distinctly margined and very minutely punctate, of a very shining deep black colour, the entire lateral margins narrowly, as well as the apex more widely, light testaceous-coloured. Underside and legs black, claws not swollen.

*Hab.* Peru.

Two specimens in my collection.

Genus *HOMOPHÆTA*, Erichs.5. *H. VARIABILIS* (*æquatorialis*, Harold?).

Elongate, subparallel, black, above flavous; elytra with the lateral

margins, an oblique transverse band before, another more horizontal band behind the middle, fuscous or ferruginous.

Length  $4\frac{1}{2}$  lines.

*Var. a.* The anterior transverse band of the elytra curved in form of a crescent.

*Var. b.* The dark colour of the elytra predominating, so as to surround three flavous patches on each elytron.

*Var. c.* Elytra fuscous, with eight flavous spots.

*Var. d.* Elytra fuscous, with two large flavous patches.

Head smooth, impunctate, with a large flavous patch in front, as well as two small spots below the antennæ of the same colour. Antennæ robust, black; all the joints, with the exception of the second one, which is very small, subequal. Thorax transversely convex, laterally narrowly marginate; the anterior angles not toothed, but acutely produced almost to the end of the eyes, their apex much thickened; surface extremely finely punctate, almost smooth; scutellum small, piceous; elytra also nearly impunctate, slightly narrowed at the base, shining flavous; the suture, to a greater or smaller extent, the external margin, the base more or less, and two transverse bands (one oblique before the middle, the second behind) fuscous.

In var. *a* the anterior band does not touch the suture, but curves down and outwards, so as to form a crescent. In the other varieties the dark colour predominates in one case to an extent so as to surround four flavous patches on each elytron, in another variety leaving only two large flavous spots, of which one is situated in the middle near the lateral margin, the other near the apex. Underside and legs black or dark brown, covered with yellowish pubescence; claw-joint moderately thickened.

*Hab.* Venezuela, Columbia, Brazil; var. *d*, Mexico.

This species bears a close resemblance to *H. 8-guttata*, Fab.; but the larger size, the colour of the transverse bands, and the absence of the small shoulder-spot will distinguish it from that species. It is also known in collections, I believe, under the MS. name of *insolita*, Chev.; *6-signata*, Dej.

#### 6. HOMOPHETA ALBOFASCIATA, sp. nov.

Ovate, elongate, black, shining; a frontal patch, two spots below the antennæ, thorax and abdomen flavous testaceous or reddish brown. Elytra metallic violaceous blue or black; a slightly curved transverse band across the middle, and a transverse subquadrate patch near the apex of each elytron, white.

Length 3 lines.

Head bluish black, vertex impunctate, shining, a row of rather deep punctures round the orbit of the eyes, a transverse spot between the latter testaceous; antennæ rather short, black, base of the second joint testaceous. Thorax with the lateral margins slightly sinuate, the anterior angles produced and thickened, and the posterior margin distinctly and obliquely sinuate at each side; surface impunctate; scutellum black, smooth; elytra convex, mar-

ginate, impunctate, black or violaceous blue; a transverse band from the margin to the suture, situated at the middle, slightly convex anteriorly, and narrowed towards the suture, and a transverse subquadrate patch, widened towards the suture, white. Underside black, abdomen flavous; claws scarcely thickened.

*Hab.* Cache, Costa Rica. Collected by Mr. Rogers.

Genus *ASPHÆRA*, Chev.

7. *ASPHÆRA APICALIS*, sp. nov.

Ovate, convex, black; clypeus and sides of thorax testaceous. Elytra purplish, the extreme lateral margins and the apex more or less flavous testaceous.

Length 3-4 lines.

Head with a few rather deep punctures, deeply transversely depressed, with a short longitudinal groove between the eyes, the space in front of the latter rather swollen. Clypeus light testaceous. Antennæ rather long, the fourth and fifth joints the longest, of equal length, the basal three joints piceous, the rest black. Thorax narrowed from base to apex, its sides broadly margined, anterior angles acute, but not produced; surface impunctate, black, the sides light testaceous; scutellum black, broadly triangular. Elytra closely and irregularly punctured, the interstices transversely and longitudinally wrinkled, to a less extent towards the apex, of a purplish colour; the apex with a triangular space extending to a greater or smaller degree upwards, as well as the extreme lateral margins, flavous testaceous. Underside and legs black. Metatarsus as long as the two following joints, claw-joint moderately swollen.

*Hab.* Brazil.

8. *ASPHÆRA BALYI*, sp. nov.

Light fulvous below; head and elytra dark metallic green, shining; thorax and two spots on each elytron testaceous.

Length  $3\frac{1}{2}$  lines.

Head with a deep transverse depression, impunctate, lower face testaceous; antennæ piceous, basal three joints testaceous. Thorax with the anterior angles not mucronate, but obtusely rounded, sides regularly rounded and broadly flattened, base with an obsoletely depressed transverse narrow groove, posterior margin sinuate at each side, surface very minutely punctured; elytra narrowly margined, throughout finely punctured, very shining dark metallic green, the extreme lateral margin, a transversely placed oval-shaped spot in the middle, and a smaller one of the same shape near the apex light testaceous. Underside fuscous or ferruginous; knees and the tibiæ piceous. Metatarsus as long as the two following joints united, claw-joint moderately swollen.

*Hab.* Peru.

9. *ASPHÆRA AMAZONICA*, sp. nov.

Elongate, subparallel, light flavous; antennæ and legs fulvous;



elytra with a large semitriangular patch at the base, and another from the middle to nearly the apex, of a brownish purplish colour.

Length  $2\frac{1}{2}$  lines.

Vertex of head smooth, impunctate, limited in front by four transversely placed deep punctures, and from the clypeus by several deep indentations; apex of jaws black; antennæ robust, all the joints, except the second, of equal length, slightly diminishing, however, towards the apex, of a uniformly fulvous colour, and closely pubescent. Thorax transversely subquadrate, the sides nearly parallel and narrowly thickened, but not depressed; anterior angles convex, but not produced outwards; surface impunctate, shining, of a very light testaceous colour; scutellum fulvous; elytra rather convex, distinctly margined, very minutely punctate, of the same colour as the thorax; each elytron with a large patch at the base, rounded anteriorly, and not touching either the margin or the suture, and another one triangularly shaped, the point directed towards the apex, of a reddish-brown colour, with a very distinct purplish gloss. Taking these patches as the ground-colour, they would be limited by the suture (widened anteriorly), a narrow band across the middle, and by the lateral margins of a light flavous colour. Underside testaceous, legs flavous, claw-joint not swollen. Metatarsus as long as the two following joints united.

*Hab.* Amazon. In my collection.

This species is closely allied to *A. nobilitata*, Fabr.; but the want of the transverse band on the thorax, together with the different shape of the latter, as well as the shape of the patches on the elytra, will distinguish it from that species.

#### 10. *ASPHERA PALLIDA*, sp. nov.

Broadly ovate, black; apex of abdomen and the thorax more or less fulvous; elytra pale testaceous, shining, impunctate.

Length  $4\frac{1}{2}$  lines.

Head shining black, impunctate, with the usual transverse depression; antennæ of half the length of the body, uniformly black, covered thickly with whitish hairs. Thorax comparatively wide, about twice as broad as long, its sides evenly rounded, narrowly margined, but each side rather indistinctly limited by the more convex disk, the anterior angles very acute and distinctly produced in form of a short tooth, basal margin very slightly sinuate at each side, almost straight. Surface scarcely visibly punctate, of a lighter or darker flavous colour; scutellum shining black; elytra slightly wider at the base than the thorax, widened till behind the middle, from there rounded to the apex, distinctly margined, smooth and shining, of a light testaceous colour, more or less stained obsoletely with fuscous in some specimens. Underside and legs shining black, the latter closely pubescent; apex of abdomen fulvous. Posterior thighs very moderately thickened; metatarsus longer than the following joints, the claw simple, not thickened.

*Hab.* Costa Rica. Collected by Mr. Rogers.

Genus *ÆDIONYCHIS*, Erichs.11. *ÆDIONYCHIS QUADRIFASCIATA*, sp. nov.

Broadly ovate, black, above testaceous; a transverse band on the disk of the thorax, and four others across the elytra, metallic violaceous blue.

Length 4 lines.

Head impunctate, deeply transversely impressed between the eyes, shining, piceous, lower part of face flavous, apex of labrum piceous; antennæ black, the first three joints flavous, stained with piceous above, the first joint elongate, the third and fourth joints subequal. Thorax very narrow, about four times as broad as long, its sides broadly margined and evenly rounded; anterior angles outwardly produced, their apex rounded, basal margin sinuate on either side, disk impunctate or scarcely visibly punctured, flavous testaceous; a black narrow band, not touching either side, extends transversely across the disk; scutellum black, smooth, broad, its sides rounded and its apex obtuse. Elytra narrowed at the base and towards the apex, finely but distinctly and moderately closely punctured, of a testaceous colour; a transverse band at the base, one immediately before, another behind the middle, as well as a fourth band near the apex, metallic violaceous or greenish blue; none of these bands extend quite to the lateral margins; and the intervals between them are of about half the width of the bands themselves. Underside and legs black, the margins of the abdominal segments obscure flavous; posterior thighs very thickened; the first joint of the tarsi shorter than the two following ones united; the claw-joint very swollen.

*Hab.* Peru. In my collection.

12. *ÆDIONYCHIS FUSCONOTATA*, sp. nov.

Ovate, widened behind, obscure piceous below, above flavous testaceous; each elytron with two small spots at the base, a transverse larger one in the middle, and another near the apex, fuscous.

Length 2 lines.

Head distinctly punctured, with a strongly-marked transverse groove; antennæ with joints three and four of equal length, the first five joints flavous, the rest piceous-coloured; anterior angles of the thorax toothed, the posterior margin nearly straight, surface impunctate, testaceous; elytra narrowed at the base, rather flattened, more convex behind the middle, distinctly punctured, the interstices slightly wrinkled, of a flavous or testaceous colour, each elytron with four fuscous spots, of which one (the smallest) is placed at the humeral callus, another (larger one) near the scutellum, a more transversely-shaped one at the middle, slightly hollowed out at its posterior margin, and the fourth (generally the largest) also transversely placed at a little distance from the apex. Underside obscure piceous, the four anterior legs entirely flavous.

*Hab.* Rio Janeiro.

13. *ÆDIONYCHIS TRANSVERSALIS*, sp. nov.

Ovate, flavous-testaceous; a transverse subquadrate band at the

base of the elytra, connected by a longitudinal lateral stripe with another band across the middle, black.

Length 3 lines.

Head impunctate, with only a few punctures round the eyes, and the usual transverse groove; antennæ entirely pale testaceous. Thorax with the sides broadly flattened, and the anterior angles produced into a short tooth, surface impunctate; scutellum testaceous; elytra rather convex, distinctly margined, minutely punctured throughout, of the same colour as the thorax, with a transverse subquadrate black band at the base, the posterior margin of which is obliquely cut, and including a small spot of the ground-colour; a narrow lateral stripe connects this band with another fascia placed at the middle of each elytron, which has the inner margin slightly hollowed out, and is in some specimens almost connected along the suture with the basal band. The prosternum is distinctly raised in shape of a ridge, and, like the entire underside and the legs, of a pale testaceous colour.

*Hab.* Nicaragua. Collected by Mr. Janson.

14. *ÆDIONYCHIS INSULARIS*, sp. nov.

Ovate, convex; obscure ferruginous below; antennæ, tibiæ, and the two pairs of anterior legs black. Thorax and elytra pale testaceous, the latter with two spots below the middle and the apex violaceous black.

Length 3 lines.

Head with several deep punctures near the eyes, and a well-marked transverse groove between the antennæ; lower half of the face testaceous, the vertex and the labrum and palpi blackish piceous with a greenish gloss; antennæ black, their two basal joints testaceous below. Thorax of the usual shape, with the anterior angles produced in form of a short tooth directed outwards; surface impunctate, pale testaceous; scutellum black; elytra widened behind, rather convex, distinctly punctate, the punctuations diminishing in depth towards the apex, but strongly marked in two longitudinal rows below the humeral callus, of the same colour as the thorax, an irregularly shaped small roundish spot below the middle, and a still smaller one at the extreme apex of each elytron, of a violaceous black colour.

*Hab.* Mexico.

Approaching in colour and markings *Æ. bipunctata*, Chev.; but this species has no apical spot on the elytra, and the legs and breast are black.

15. *ÆDIONYCHIS NICARAGUENSIS*, sp. nov.

Ovate, convex, dark ferruginous below; head, thorax, and elytra flavous-testaceous; the base and shoulder of each elytron, two spots below the base, and two transverse fasciæ behind the middle dark ferruginous.

Length 3-4 lines.

Head with several deep punctures on the vertex, and a cruciform

depression; antennæ and lower part of face obscure ferruginous, the third joint of former not much longer than the second, the fourth joint the longest. Thorax with the anterior angles but slightly produced and rounded; surface finely punctured, shining testaceous or flavous. Elytra widened behind, rather deeply and very closely punctured, with a distinct longitudinal depression in the middle of the base; the latter narrowly ferruginous, which colour also extends in form of a longitudinal short streak down the shoulders to about one third the length of the elytra; another sutural semi-square spot is placed below the scutellum, while a transverse short fascia occupies the middle, and another similar-shaped spot is placed near the apex of each elytron. Neither of these markings touch the suture or the lateral margins. Claw-joint strongly inflated.

*Hab.* Irazu Mountain, Costa Rica, and Nicaragua.

16. *ÆDIONYCHIS SEPTEMMACULATA*, sp. nov.

Piceous below; lower part of vertex, thorax, and elytra testaceous, the latter with seven black patches, viz. two at the base, one common to both elytra before the middle, the other four at the middle and before the apex respectively.

Length 3 lines.

Vertex impunctate, lower part of the latter, as well as that of the clypeus, testaceous; antennæ piceous, basal joints paler. Thorax rather convex, sides broadly margined, the anterior angles produced into a short tooth; surface minutely punctured, testaceous; scutellum obscure piceous: elytra narrowed at base and apex, broadly margined, with two short longitudinal depressions at their posterior half, more distinctly punctured than the thorax, of a light testaceous colour, with the patches of the following shape—the basal one obliquely cut at its posterior margin, the sutural one of triangular shape, followed closely by a transverse quadrate fascia, and the apical one also of a transversely subquadrate shape; none of these markings touch the sutural or the lateral margins. Claw-joint greatly dilated.

*Hab.* Peru.

2. On a Fourth Collection of Birds made by the Rev. G. Brown, C.M.Z.S., on Duke-of-York Island and in its vicinity. By P. L. SCLATER, M.A., Ph.D., F.R.S., Secretary to the Society.

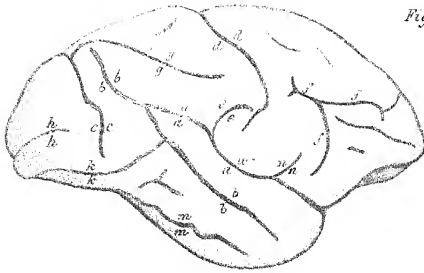
[Received May 2, 1879.]

(Plates XXXVI., XXXVII.)

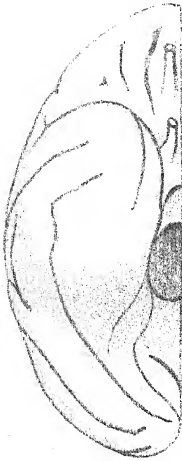
I have now again the pleasure of laying before the Society a series of bird-skins collected by our excellent correspondent Mr. Brown on Duke-of-York Island and on the adjacent parts of New Britain and New Ireland. Though many of these specimens belong to species



*Fig. 1.*



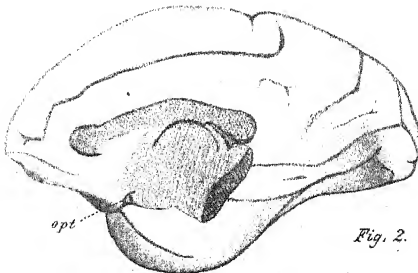
*Fig. 4.*



*Fig. 3.*



*Fig. 2.*



J.Smit kth.

Hanhart imp.

BRAIN OF GELADA RUPPELLI

of this bird as differing from New-Guinea specimens in the markings of the wings and tail; but, judging from the series at the British Museum, I do not think that these are constant characters."

### 29. *CARPOPHAGA VAN-WYCKI*.

Of this and the other Pigeons of Duke-of-York Island, Mr. Brown writes as follows:—

"Of your new *Carpophaga melanochroa* I have only obtained one skin. *C. vanwycki* and *C. rubricera* are our commonest Pigeons, and can be got in any numbers. If you wish for any specimens I can easily get them, as we are shooting them every day. *Edirkhinus insolitus* is also very abundant; I have tried several times to rear some for transmission to you, but have not yet succeeded in keeping them for more than a few months.

### 35. *AMAURORNIS MOLUCCANA* (Wallace).

*Porzana moluccana*, Wallace, P. Z. S. 1865, p. 480.

*Gallinula ruficrissa*, Gould, B. Aust. Suppl. pl. 79.

*Amaurornis moluccana*, Salvadori, R. Accad. Sci. di Torino, vol. xiv.

I have not been able to make a comparison; but I suppose that the Duke-of-York bird is referable to this southern form of *A. olivacea* (Meyen) of the Philippines.

## 3. Notes on the Anatomy of *Gelada rueppelli*.

By A. H. GARROD, F.R.S., Prosector to the Society.

[Received May 7, 1879.]

(Plate XXXVIII.)

Having had the opportunity of dissecting the adults of both the sexes of *Gelada rueppelli*, the female of which lived a short time in the Society's Gardens, where it died, I desire to record some points in the anatomy of the species which appear to be of interest.

The following are measurements from the skins, except when otherwise indicated:—

	♂ adult.	♀ adult.
	inches.	inches.
From margin of upper lip, over head and along back, to base of tail.....	28·75	29·2
Same measurements from body with skin removed...	24·5	25
Tail, without hairy tuft .....	24·75	25
Tuft of tail .....	8	3·5
From wrist to end of nail of middle digit of hand...	5	4·5
From heel to end of nail of middle digit of foot.....	7	6·25
From angle of axilla to end of nail of middle digit of hand .....	16·25	15·1
From mid-perineum to end of nail of middle digit of foot .....	9	11
Nail of middle digit of hand along convexity .....	1·1	1·15
Nail of middle digit of foot along convexity .....	1·01	1·01

With reference to the male, its general colour is a dark sooty chocolate-brown. The shoulder, forearm, back of hand, and instep, as well as most of the tail, with the exception of its end, are black. The palest brown is found on the abdomen, though this is very dark. A few white hairs mixed with the brown-black of the tail-tuft give that a lightish tint. The longest hair is that between the shoulders, where it reaches as much as eleven inches. This lengthy hair extends upwards over the occiput quite forward to the superciliary ridge, and downwards to the loins, below which it rapidly reduces before the base of the tail is reached. Laterally the long hair extends over the shoulders, and less considerably under the arms, towards the lateral margins and to the surface below the nude chest-space. The hair on the abdomen is about 2.75 inches long, that outside the thighs 4 inches, that on the tail an inch, except the end tuft, where it reaches 3.5 inches.

The characteristic nude chest-space is double in the male, being formed of two median triangular isosceles areas reversely directed, with their apices approximate, but separated by an interval, 1.5 inch in length, of hair-covered skin. The base of the very obtuse-angled upper triangle, which is margined by black hair, is five and a half inches from the middle of the lower lip, and is situated opposite the larynx, its length being 3.75 inches, and its depth not being more than an inch. The lower triangle is also very obtuse-angled, with its base, slightly concave downwards, six inches long.

Although the two nude triangles above described do not meet, they tend to form an hour-glass surface of florid skin, 7.75 inches along each lateral curve from horn to horn. The hair bordering it is an inch long or so and iron-grey in tint, from the almost equal admixture of black and white hairs. There is no carunculation of the skin in the nude spaces or at their borders. The pair of nipples are closely approximate, not being more than a quarter of an inch apart in the dried skin. They are situated in the nude area of the lower triangle, an inch above its base.

In the female the general tint is much the same as that of the male; the hair is very much shorter and less faded at the tips. The interscapular hair is the longest, reaching nearly four inches, whilst that of the loins is not so black as in the male.

The pectoral nude space is in the female carunculated all along its lateral and inferior borders. The two triangles which go to form it join apically by an isthmus 1.3 inch broad. The marginal hair is not mixed with white. The caruncles are numerous, and about a quarter of an inch in breadth, being ovate and flattened. The nipples are situated as in the male, and are an inch apart.

In both sexes the face is nude below the line of the frontal eminences, and laterally from points a little less than half an inch outside the outer canthus of each eye, the nude spaces running straight downwards in the direction of the angles of the mouth, just before reaching which they turn and include the chin.

The ischial callosities, which are subcircular, and a little less than two inches in diameter, are situated in a naked area which is carun-



culated in the female. This area extends forwards for three and a quarter inches, broad opposite the mons veneris, which is therefore nude, the anterior border being non-carunculated, and gradually lost in the sparse hair of the abdomen.

Osteological comparisons between *Gelada* and its allies are very attractive, but do not lead to very definite results. Those most important in my estimation will be here recorded.

The following are measurements of the larger bones in the male:—

	inches.
Length of humerus.....	7.1
„ radius.....	7.4
„ ulna.....	8.35
„ femur.....	7.45
„ tibia.....	7.6
„ fibula.....	7.0
„ scapula.....	5.25 (extreme)
From anterior margin of præmaxilla to occiput.....	6.5 (5.8 in ♀)
Extreme breadth at posterior parts of zygomata.....	4.1 (4.0 in ♀)
Extreme breadth of orbit.....	0.9 (same in ♀)
Interorbital interval.....	0.425 (0.35 in ♀).

There are 13 pairs of ribs, of which 5 are false. The sacrum consists of three vertebræ. The clavicles form a single curve; and the anterior margin of the manubrium sterni is *not* much thickened.

My opportunities for examining the skulls of adult specimens of Monkeys being but few, it is impossible to generalize to any extent with safety. *Cercopithecus* differs from *Macacus* and *Cynocephalus* in not possessing a fifth lobe to its mandibular third molar. In *Gelada* this extra lobe is large, as is the anterior talon on the maxillary molars, which are small in *Cynocephalus*, and much smaller still in the Macaques I have examined. In *Gelada* the upper incisors are at right angles to the alveolar margins of the premaxillary, which is the case in *Macacus*; in *Cynocephalus* and *Cercopithecus* they converge as they descend.

The profile view of the *Gelada*'s skull exhibits the great anterior development of the sharp median portion of the supraorbital ridge and the deep concavity of the nasal contour. In *Gelada*, *Cercopithecus*, and *Cynocephalus* the nasal bones are separate, elongate, and narrow, appearing superficially upon the skull as high as the supraorbital frontal ridge. In *Macacus* they fuse, and form a short broad triangle whose apex does not reach the frontal bone, the maxillaries meeting above it.

In *Gelada* there is no trace of any groove or foramen for the supraorbital vessels and nerve. This is also the case in *Cercopithecus*. In *Macacus* and *Cynocephalus*, however, the groove is very deep, almost forming a foramen. The malar foramen is also wanting in *Gelada*. Its presence in allied genera is uncertain. There is a foramen in the fronto-malar suture.

In *Macacus* and *Cynocephalus* the anterior palatine foramina open into an osseous depression, which is continued for some distance forwards, almost to the alveolar margin. In *Gelada* they open directly upon the surface of the palate.

In *Macacus* and in *Cercopithecus* a powerful transverse ridge of bone is seen to form the posterior boundary of the osseous palate. This is not seen in *Gelada* or in *Cynocephalus*.

In *Cynocephalus* the mastoid process of the temporal bone is fairly developed. In *Gelada*, *Cercopithecus*, and *Macacus* it is obsolete.

In *Cynocephalus* and *Macacus* the hamular process of the internal pterygoid plate of the sphenoid bone is much more superficial, and is placed more forward than in *Gelada*.

The left lung is two-lobed, the lower being slightly the larger. The upper is nearly divided transversely into two moieties, of which the lower is a little the smaller.

The right lung has four lobes, the (bifid) azygos being the smallest, the middle next in size, elongate and triangular. The obliquely cut upper lobe is smaller than the subquadrate largest lower lobe.

There are three circumvallate papillæ at the base of the tongue, arranged in the characteristic V.

The following are intestinal measurements:—

	Male. inches.	Female. inches.
Small intestine . . . . .	90	129
Large intestine . . . . .	58	51
Cæcum . . . . .	3	3

The stomach much resembles that of man in shape, being a little more elongate. There is no appendix vermiformis to the sacculated cæcum, which does not differ from that of the lower Old-World Monkeys. The colon is sacculated throughout.

The spleen is three inches long, one and a half inch broad, being suboblong and slightly bifid at one extremity.

The kidneys are ovate, not reniform, and with but a single pyramid in each.

There is an os penis three quarters of an inch long. The vagina is very hirsute, with large broad transverse rugæ. The uterus is pyriform.

To understand the bearing of the details of the anatomy of the liver of the *Gelada*, it will be necessary to view the peculiarities of the organ in allied genera. This the inspection of a large number of species enables me to do.

In the genus *Macacus* the liver is comparatively uncomplicated. The right and left lateral fissures are well marked, the umbilical fissure being less considerable and less constant in depth. The abdominal surfaces of the right and left central lobes are frequently

connected by a bridge of hepatic tissue. The inferior margin of the right central lobe is straight, and at right angles to the axis of the gall-bladder, which latter organ is deeply imbedded in a cystic fossa, never deep enough to appear on the diaphragmatic surface. The fundus of the gall-bladder never reaches the inferior margin of the organ, though it approaches very near to it. There is no trace of a cystic fissure. The interval between the inner border of the cystic fossa and the umbilical fissure is always broad, a quadrate lobule intervening. The left central is generally the smallest of the four main lobes, it being vertically elongate. The left lateral lobe is shaped much like the sector of a quarter of a circle, with the apex directed to the portal fissure. This apex is often simple; but when not so a slight fissure runs for a short distance from the superior border of the lobe, not far from the apex, *parallel* to the left lateral fissure. The right lateral lobe is subquadrate in form; its surface presents no irregularities, as a rule; but when present they take the form of deep semilunar incisions on its abdominal surface. The abdominal margins of the umbilical fissure frequently present small lobelets of a bluntly conical form, with their apices directed downwards. These are most frequently situated on the left central lobe, but sometimes on the right, sometimes on both. The caudate lobe is elongatedly subfusiform, without any renal depression; its apex reaches *as far as* the extreme right margin of the right lateral lobe. The Spigelian lobe is well marked, being small and thin; its shape is that of the tip of the compressed finger of a glove; it is directed backwards.

The genus *Cercopithecus* differs from *Macacus* in the following respects:—The inferior margin of the right central lobe is rarely anything approaching a straight line at right angles to the axis of the gall-bladder; a slight notch often also indicates the rudiment of a cystic fissure. The imbedded fundus of the gall-bladder is likewise generally visible on the diaphragmatic surface of the right central lobe. The interval between the left margin of the cystic fossa and the umbilical fissure is narrow, and often not more than a sharp vertical ridge of hepatic tissue. The apex of the left lateral lobe (directed, as in *Macacus*, towards the portal fissure), when complicated, is rendered so by a short fissure running from the superior border of the lobe, *not* parallel to the left lateral fissure, but downwards and inwards, so as to produce a subtriangular lobelet, in which the free margin is directed horizontally upwards. When complicated the right lateral lobe develops lobules on its abdominal surface, not semilunar incisions. The caudate lobe runs to the extreme margin of the right lateral lobe, as in *Macacus*. The Spigelian lobe is frequently absent, and when present is irregular and much smaller than in *Macacus*.

In the genus *Cynocephalus* the peculiarities of *Cercopithecus* are observed, except that the caudate lobe is very short, only extending half across the right lateral lobe horizontally. The Spigelian lobe is also well developed, quite as much or even more so than in *Macacus*, it being thicker than in that genus.

In *Gelada* the right and left central lobes are proportionally larger than in the genera above described. Otherwise it most resembles *Cercopithecus*, differing from it in that the cystic fissure is shallow, at the same time that the fundus of the gall-bladder does not so nearly approach the inferior border of the right central lobe. It resembles *Cercopithecus* in that the Spigelian lobe is absent, at the same time that the caudate lobe is long, in both which respects it contrasts strongly with *Cynocephalus*. The only lobelet is one on the right border of the umbilical fissure, which is Macaque-like. It differs from *Macacus* in the obliquity of the inferior border of the right central lobe, and in the nearness of the gall-bladder to the umbilical fissure, as well as in the absence of a Spigelian lobe and the large size of the central lobes.

The brain of *Gelada rueppelli* is particularly instructive when compared with the beautiful series of figures in Gratiolet's 'Mémoire sur les Plis Cérébraux de l'Homme et des Primates.' Its different aspects are represented, natural size, on Plate XXXVIII. Its most marked feature is the relatively small size of the occipital lobe, which is about as large as in the *Semnopithecus*, smaller than in the *Cynocephalus*, and much smaller than in *Macacus* as well as *Cercopithecus*. In the two last-named genera this lobe is unconvoluted, or very slightly so. In *Gelada* there is a simple horizontal sulcus (*h, h*) a short distance above its lower border, running from the posterior surface some way forward, but not so far as to meet the posterior transverse sulcus (*c, c*). In *Cynocephalus* the occipital lobe is more elaborately convoluted.

An inferior horizontal occipital sulcus, parallel to that just described, runs so far forward as to join the major oblique temporo-parietal sulcus (*b, b*). This is a condition recorded by Gratiolet in *Semnopithecus maurus* only, the sulcus generally turning upwards to end independently.

The major oblique temporo-parietal sulcus (*b, b*) commences below, near the inferior rounded margin of the temporal lobe, and runs upwards as well as backwards to near the middle line of the brain. It is joined by the prolongation upwards of the Sylvian fissure (*a, a*), two thirds from its lower end, it being bent slightly forward at the point of junction.

Surrounding the upper end of this last sulcus, but not meeting it, is one whose posterior limb (*c, c*) forms the anterior boundary of the occipital lobe, the posterior transverse fissure, whilst its anterior limb (*g, g*) runs forwards, downwards, and outwards, to end independently as in allied Primates. Where these two limbs meet a small sulcus runs inwards to the middle line, becoming conspicuous on the median aspect of the hemisphere.

The prolongation upwards and backwards of the Sylvian fissure on the outer surface of the brain meets the major oblique temporo-parietal sulcus as above mentioned. Whether or not it should meet it is uncertain in allied species of the same genus according to Gratiolet. It is peculiar, however, in that from a little above and below its middle it sends forward small branches (*e, e* and *n, n*). In

the *Cynocephali* alone is any thing of this kind seen, and in them the lower of these two sulci only (*n, n*).

The anterior transverse (parietal) fissure (*d, d*) commences externally between the two small sulci just described (*e, e* and *n, n*). After running forward and upward it bends, turning slightly backwards to the middle line, where it is continued downwards upon the median surface of the hemisphere for a short distance, as in no species described by Gratiolet.

The three-way convolution of the frontal lobe (*fff*) resembles that in the *Cynocephali*—the *Semnopithec*i, *Macac*i, and *Cercopithec*i almost or entirely lacking its posterior limb, which is well represented in the *Geladas* and *Baboons*.

Small independent sulci are more numerous than in *Macacus* and *Cercopithecus*—about as many as in the *Cynocephali*, with which the *Gelada* most agrees in size.

Correlation of the facts above recorded makes me place *Gelada* along with *Cercopithecus* and *Cynocephalus* away from *Macacus*. Its affinities with *Cercopithecus* seem to me more intimate than with *Cynocephalus*, to which genus it most certainly does not belong.

#### EXPLANATION OF PLATE XXXVIII.

Brain of *Gelada rueppelli*, natural size.

- |         |                   |                  |
|---------|-------------------|------------------|
| Fig. 1. | Right hemisphere, | outer aspect.    |
| 2.      | " "               | inner aspect.    |
| 3.      | " "               | superior aspect. |
| 4.      | " "               | inferior aspect. |

#### 4. Notes on and Description of the Female of *Ceriornis blythii*, Jerdon. By Lieut.-Col. H. H. GODWIN-AUSTEN, F.Z.S.

[Received May 15, 1879.]

(Plate XXXIX.)

I have much pleasure in exhibiting the female of the rare *Ceriornis blythii*, which up to the present time was unknown<sup>1</sup>. For the acquisition of this bird, and our further knowledge of the species, I am indebted to Capt. W. Brydon, of the 42nd Assam Light Infantry, who obtained several of this species in the Aughami Naga hills. He tried very hard to bring two of them to England alive,

<sup>1</sup> Since this paper was read we have received vol. vii. No. 6, of 'Stray Feathers.' At p. 472 is a paper by Mr. A. O. Hume on this species, which leaves the true plumage of the female still in some state of uncertainty. Either the bird described by him is a female in a younger stage of plumage, or Capt. Brydon and Lieut. Macgregor, who have kept these birds in captivity, are mistaken as to the female putting on the red colour about the neck and thus assimilating the plumage of the male to this extent.—H. H. G.-A.

but without success; one, which he brought safely down to Calcutta and embarked on board ship, died from accidental exposure to sea-water after leaving Colombo. The history of the first discovery of this bird was given by Dr. Jerdon in the 'Proceedings of the Asiatic Society of Bengal,' 1870, p. 59; and he then very appropriately named it after one who had laboured so long and so ably at Indian ornithology.

Curious to say, the first bird ever obtained from the natives was brought to England alive, together with the still very rare and then new species, *Lophophorus sclateri*, and both were finally deposited in the Society's Gardens, where they lived a short time. The only other specimen I know of the latter bird was also obtained by Capt. Brydon at Saddya, and is now in the Indian Museum, Calcutta.

A full account of both species, by Mr. P. L. Sclater, is to be found in the P. Z. S. for 1870, p. 162, with figures drawn by Mr. Keulemans.

In Elliot's 'Monograph of the Phasianidæ,' a splendid drawing is given of the male of *C. blythii*, unfortunately represented sitting on a pine tree; no pines, however, are to be found in that portion of the Burrail range occupied by this bird, although *Pinus khasiana* comes in at a lower altitude in the more open country further east and west.

#### CERIORNIS BLYTHII ♀. (Plate XXXIX.)

*Cerionis blythii*, Jerdon, P. A. S. B. 1870, p. 60.

♀ (by dissection, *Brydon*). Head above black, with ear-coverts and a broadish line down the side of the upper neck of the same colour; above the eyes a dark orange-red line commences, and extends back beyond the occiput. The back is uniformly and finely mottled with umber-black and ochre, some of the feathers on the upper margin having two small terminal chestnut spots, with a minute white central and terminal ocellus between them. This spotting disappears towards the upper tail-coverts, which are tipped with rusty brown. The tail is irregularly barred with mottled ochre and black. Chin and throat whitish, each feather narrowly margined black. The nape and upper breast of a rich orange-chestnut colour, somewhat duller than in the male, followed posteriorly by plumage of a pale umber ground, more or less finely mottled with the umber-black, which increases on the flanks, while some of the feathers have terminal ashy spots margined black, and white-shafted. These feathers on the abdomen merge into feathers dark-tipped as seen against the paler hue of that part. The thighs are narrowly barred dull black and ochre, a few of the thigh-coverts tipped dull white. The wing is more richly mottled with ruddy ochre and black, the former colour merging into sienna-brown on the indistinct barring of the primaries. No spurs.

Dimensions: wing 9·75, tail 6·5, tarsus 3·5 inches; of a male in my possession, which was the second specimen obtained, the wing is 10·9 inches.

In my 4th List of Birds from N.E. Frontier (J. A. S. B. 1874,

p. 172), the true habitat of this species is recorded, viz. the Burrail range, at from 6000 to 10,000 feet.

The following extracts from a letter written by Lieut. Macgregor, of the 44th Sylhet Light Infantry, on the habits of *Cerionis* are very interesting; and I cannot do better than give the observations in his own words:—"This bird inhabits the high ranges of the Naga hills; it is found at altitudes ranging from 9000 to 5000 feet, most frequently on the Burrail range, near Khonomah. The Nagas say that it does not migrate, but in the winter months it descends from the higher ranges down to 5000 feet. This is the season that specimens of the bird are generally obtained. The *modus operandi* is as follows:—Nooses are placed in the paths that the birds are known to frequent, and a large number of men are employed as beaters: they drive the birds before them slowly and quietly up to the traps (if they made too much noise probably the birds would take to flight). The specimens that I have now in my possession eat worms and a kind of red berry. One that I had last year in the Naga hills used to eat *dhan* (unhusked rice). Out of three that were brought away from the hills only one arrived alive in Calcutta; but this was in the hot weather. The young female has a plumage very like that of a hen Floriken (*Sypheotides bengalensis*); when it gets older it assumes a plumage more like the cock, becoming red on the throat and on the back. The cry of the birds is like the sound 'ank' repeated several times. The Nagas give the bird the name of 'Née.' The Nagas say that the Argus lays three eggs; but as this was in answer to a *leading question*, I cannot vouch for it."

As *Polyplectron chinquis* and two species of *Cerionis* are mentioned in a paper by Mr. Selater read before this Society a short time ago, as laying only two eggs, it is very probable that the Naga information is accurate; for these people have a wonderful knowledge of all the beasts and birds and of their habits. In such forests, and exposed to so much danger from many formidable enemies, the parent birds can seldom rear more than two at a time: they are driven to roost in the low trees in comparative safety; and in such a position the hen could only take one chick under each wing. A greater number of eggs could be only a waste of life, and would, if hatched out, only encumber the mother, and possibly lead to her own destruction; for it must be remembered that in dense forests, cats and other small predatory mammals have the great advantage of being able to stalk their prey, and approach unseen to within a yard or two.

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June 3, 1879.

Prof. Flower, LL.D., F.R.S., President, in the Chair.

The Secretary laid upon the table two volumes of original drawings of the birds of India, which had been deposited in the Society's Library by Brigadier-General Andrew Cooke Mc'Master.

The two volumes contained about 270 figures of the birds of the Indian Peninsula, mostly named and arranged after Jerdon's 'Birds of India,' and would be of great use in determining Indian birds.

The drawings were stated to have been mostly made by soldiers in General Mc'Master's house at Secunderabad, under his superintendence; but some had been executed by the native artists of Southern India at Trichinopoly and Bangalore.

Mr. C. L. Jackson, F.Z.S., exhibited the skull of the female Sea-lion (*Otaria stelleri*?) which was lately living in the Southport Aquarium, and which had been killed by the male suddenly jumping from the rock and striking against her.

Mr. Sclater laid before the meeting a small collection of birds lately forwarded to him by Dr. Adolf Döring, Professor of Chemistry in the University of Cordova in the Argentine Republic, and made the following remarks on them:—

(1) *LOPHOSPINGUS PUSILLUS* (Burm.); Cab. Journ. f. Orn. 1878, p. 195.

I quite agree with Dr. Cabanis that the proper situation for this bird is not with *Gubernatrix*, as placed by Burmeister, but I rather question whether it ought not to be in the same genus as *Coryphospingus griseo-cristatus* (Lafr. et d'Orb.).

(2) *TÆNIOPTERA MURINA* (Lafr. et d'Orb.); Sci. P. Z. S. 1872, p. 541; Cab. l. c. p. 196.

Agrees with Mr. Hudson's skins from the Rio Negro of Patagonia.

(3) *CNIPOLEGUS CINEREUS*, Sci. P. Z. S. 1870, p. 58; Cab. l. c. p. 197.

A female of this interesting species, of which I described the male from a single skin in the collection of the Smithsonian Institution.

(4) *HABRURA MINIMA* (Gould); Cab. et Heine, Mus. Hein. ii. p. 53.

*Hapalura minima*, Cab. J. f. O. 1878, p. 197.

This is the first example I have ever been able to procure of this scarce and delicate little Tyrannine bird.



- (5) *FURNARIUS TRICOLOR*, Döring; Cab. J. f. O. 1878, p. 196.

This little species, which is quite new to me, is even rather smaller than *F. minor*, Pelzeln, and quite different in colour.

- (6) *SYNALLAXIS ORBIGNII* (Reichenb.); Sci. P. Z. S. 1874, p. 22.

Dr. Döring's skin is marked "*S. fugax*, sp. nov.," but agrees well with one in my collection (ex Mendoza, *S. crassirostris*, Landbeck) which I refer to *S. orbignii* (Reichenb.).

- (7) *SYNALLAXIS SCLATERI*, Döring; Cab. J. f. O. 1878, p. 196.

This species, which Dr. Döring has done me the honour to call after me, is certainly very nearly allied to my *S. hudsoni* (P. Z. S. 1874, p. 25), and may be the same. Unfortunately I have mislaid the typical specimen of *S. hudsoni*, and cannot make the necessary comparison. There is a faint tinge of yellow on the throat of *S. sclateri*; this was certainly well marked in my *S. hudsoni*.

- (8) *PHACELLODOMUS SIBILATRIX*, Döring, MS.

I have already a Bolivian example of this species in my collection, but had confounded it with *P. frontalis*, as likewise Lafresnaye and D'Orbigny seem to have done. It appears distinguishable from *P. frontalis* by the rufous colour on the bend of the wing.

- (9) *NOTHOPROCTA DOERINGI*, Cab. J. f. Orn. 1878, p. 198.

This species is closely allied to *N. pentlandi* (Gray), of Bolivia, and to *N. punctulata* (Gray), of Chili. Specimens of all three species are in the Paris Museum.

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The following papers were read :—

1. A Description of the Vessels of the Neck and Head in the Ground-Hornbill (*Bucorvus abyssinicus*). By W. OTTLEY, F.R.C.S., Demonstrator of Anatomy at Univ. Coll. Lond.

[Received May 17, 1879.]

In a paper read before this Society in 1876 (see P. Z. S. 1876, p. 60), Mr. Garrod drew attention to a peculiarity in the vessels of the neck of the Ground-Hornbill, and pointed out that the carotid arteries, instead of being found in their usual place in the middle of the neck and in the hypapophysial canal, were replaced by two vessels which accompanied the pneumogastric nerves as far as the head. This peculiarity had not been observed in any other bird, the nearest approach to it being found in some Parrots, where such a vessel is found on one side of the neck, while the carotid artery of the other has its normal position. Though at first inclined to suppose that these aberrant arteries were really carotids, Mr. Garrod felt some doubt on the point,

and was kind enough to give me an injected specimen, the arteries of which are described in this paper, in order to determine the question.

The results of this examination show that, besides the possible varieties in the arteries of the neck enumerated by Barkow in his admirable paper in Meckel's 'Archiv' for 1829, there is a further variety which he had not calculated upon.

Meckel classifies these possible varieties in the following manner :—

1. Both common carotids may run up the side of the neck. (Not yet observed.)
2. One common carotid may be in the middle line and one on the side of the neck.
  - a. The left superficial.
  - b. The right superficial. (Not yet found.)
3. Both may be in the middle line.
  - a. The left covering the right. (Usual.)
  - b. The right covering the left.
4. They may unite in the middle line and divide again above.
  - a. Both equal in size. (As in the Common Bittern.)
  - b. Left may be smaller. (As in *Phanicopterus*, observed by Garrod.)
  - c. Right may be smaller. (As in *Cacatua sulphurea*, observed by Meckel.)

The variety which is met with in *Bucorvus*, however, is of a different nature. Here there are two superficial arteries accompanying the pneumogastric nerves, and they end above by anastomosing with the vertebral arteries. But they are not carotid arteries; for there remain two fine cords, the obliterated common carotids, which are attached below to the vertebral arteries, and which run inwards to the middle line and continue up the neck in the hypapophysial canal, covered over by fascia, but in no place by a bony arch. Opposite the body of the fourth cervical vertebra both these fine cords leave the canal, and, bending outwards beneath the œsophagus, end by joining the vertebral arteries again very soon after these have turned forwards, when they have escaped from their bony canal, and just beyond the point where the internal carotid arteries are given off.

The superficial arteries are then the enlarged representatives of the anastomosing ascending and descending cervical arteries, which usually are branches of the common carotid and superior thyroid arteries respectively; and their relatively large size is to be accounted for by the obliteration of the common carotids.

As a result of this arrangement of the vessels of the neck, the origin of the arteries for the supply of the head differs from that usually met with; and the second drawing shows the course of these vessels, which hardly differed from one another on the two sides, except as regards the size of one or two of the trunks.

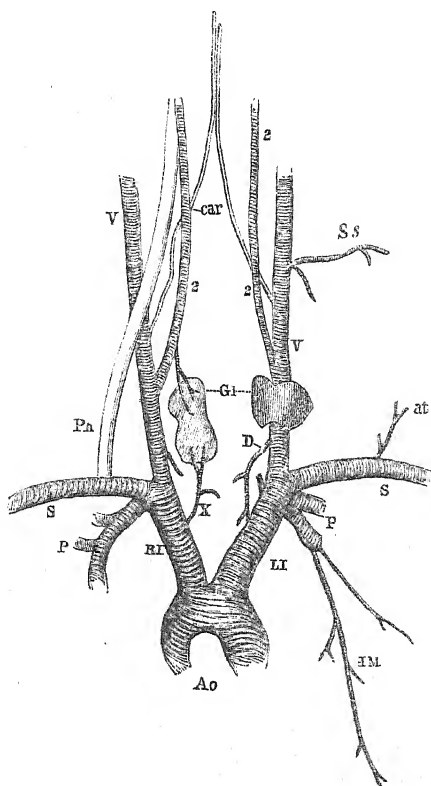
#### *Description of the Vessels.*

The innominate arteries are given off from the aorta as usual; and after a short course upwards, across the bronchi, both arteries break

up into numerous branches, which closely resemble one another on the two sides. In the plan (fig. 1) certain vessels are drawn on one side, others on the other, for the sake of greater distinctness.

The first branch given off, P, is the large artery to the *pectoralis primus*, from which comes off an internal mammary, IM., and

Fig. 1.



Plan of the innominate arteries and their branches.

another small vessel to the sternum. Opposite the same point the innominate gives off a branch X, which supplies the gland lying on the vertebral artery and anastomoses in its substance with a branch

from the *comes nervi vagi*, 2, and which also furnishes several branches to the syrinx and its muscles. And, lastly, the innominate divides into subclavian and vertebral. From the former, S, only one branch, the acromial thoracic, *at*, is seen to spring, before the artery escapes from the thorax. The latter, V, soon sends a branch downwards, D, which runs with the recurrent laryngeal nerve, and ends by supplying the bronchus, the lung-substance, and the œsophagus. The next branch, 2, is the *comes nervi vagi*, which runs up the neck with the vagus nerve, and ends by anastomosing with the vertebral. In its course it supplies:—(a) a branch to the thyroid gland, *Gl*; (b) a series of vessels forwards to the œsophagus, where they form loops and supply several branches to the trachea as well as to the skin; (c) near the head a small offset to the internal pterygoid muscle. After this the vertebral gives off a suprascapular artery, *Ss*, and a superior intercostal (which from its lying behind the vertebral cannot be represented) to the upper three spaces; and between these two and the branch 2 a white thin cord springs from the inside of the vertebral, and, crossing, inwards beneath the *comes nervi vagi*, gets beneath the œsophagus to the hypapophysial canal. Here it is joined by its companion of the opposite side; and these cords run up the neck side by side till near the fourth cervical vertebra, when they bend outwards, get from beneath the pharynx, and end by joining the vertebral trunk (as seen in the second plan of vessels), just after this artery has sent off that branch which furnishes the internal carotid.

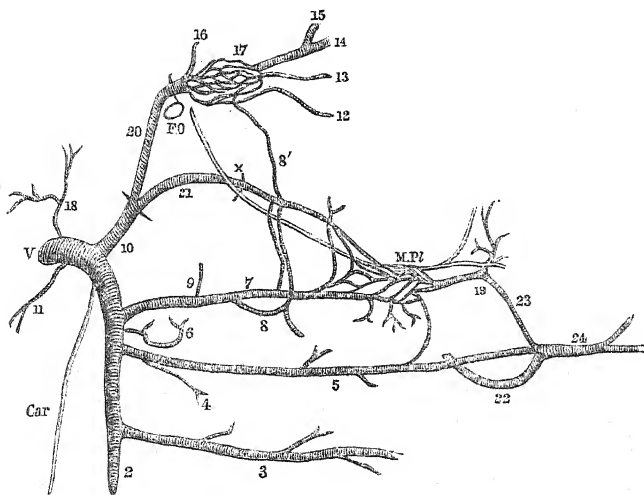
It thus appears that the two true carotids are obliterated, while their duty is performed by a superficial vessel on each side, which, accompanying the vagus as it does, might be called the *comes nervi vagi*, though by its position in the neck this vessel rather resembles the true carotid of Mammalia. These vessels did not differ much in size; the right was somewhat larger; but the vertebrales were almost precisely symmetrical.

As a result of this change in the vascular supply of the neck, the arrangement of the vessels in the upper part of the neck and in the head was a good deal modified. In the place of an anastomosis between the vertebral and an occipital branch of the carotid, the vertebral, which is large, turns forward and completes an arch with the superficial *comes nervi vagi*, whose concavity is joined by the obliterated carotid, while its convexity furnishes the branches for the head.

The following is a short description of their course and distribution (*vide* fig. 2, p. 465). After the vertebral artery has turned forwards out of the canal in the cervical transverse processes, its first branch (18) is distributed to the muscles attached to the back of the head. Another small branch (11) is given downwards to reach the digastric and internal pterygoid. A large vessel (10) then comes off, which soon enters a bony canal behind the tympanum (the limits of which are marked by the transverse lines in the plan), and divides into two (20, 21); the upper vessel (20) turns behind the fenestra ovalis (F O), and, then emerging from its canal, furnishes a large offset to the orbital plexus;

it is continued through this plexus and divides almost immediately into two branches (14, 15), both of which supply the contents of the orbit, and eventually anastomose with the ethmoidal artery; 14 runs near the roof of the orbit, 15 under the optic nerve. The orbital plexus (17) furnishes two small branches (12, 13) to the eyelids and the muscles of the eye, a vessel (16) which runs in front of the quadrate bone, and ends in the muscles attached to the mandible, and a descending branch (8'), the course of which will be presently described.

Fig. 2.



Plan of the arteries for the supply of the head and neck. Right side.

The vessel 21 is the internal carotid; opposite the mark *x* a large offset is sent to the maxillary plexus (M.Pl.), which is joined on its way by a communication from the internal maxillary artery (7). After giving off this large branch the internal carotid continues its tortuous course through a special bony canal till it reaches the interior of the cranium. A small nerve (a branch of the facial) crosses the internal carotid artery on its outer side where the communicating offset leaves that vessel.

The next branch of the vertebral is the internal maxillary (7), a large vessel which runs above the internal pterygoid muscle. Its first branch (9) ends in muscular offsets.

The next (8) emerges from behind the triangular tendon of the external pterygoid, is joined by a communication from the orbital

plexus (8'), and, accompanying the inferior dental nerve, ends in the mandible. After this the internal maxillary artery breaks up into the maxillary plexus, which furnishes many branches to the internal pterygoid and to the muscle which depresses the upper jaw. The plexus is joined by a branch from the palatine artery (5), and furnishes a large offset (19), which is partly distributed to the olfactory mucous membrane, partly (23) ends by anastomosing with the common trunk formed by the union of the palatine arteries.

The next branch of the vertebral (6) is a small vessel which supplies the internal pterygoid, and, turning across the spine behind the pharynx, ends by joining its fellow of the opposite side.

The next (5), the palatine artery, furnishes branches to the internal pterygoid, and runs along the lower surface of that muscle. In front it meets and joins its fellow, the left being considerably the larger. The common trunk thus formed is joined by an offset from each maxillary plexus, and soon breaks up into larger branches; it is distributed to the lower surface and the interior of the beak.

The last branch of the vertebral, before it joins the *comes nervi vagi*, is the lingual artery (3). This supplies the muscles above the hyoid bone, and the mucous membrane of the mouth; it joins its fellow at the symphysis, and ends in the substance of the mandible.

The obliterated carotid (*car*) is seen joining the vertebral, close to the origin of the branch 10.

After the internal carotid (21) has given off its branch to the maxillary plexus, it runs along its canal to enter the skull on the side of the *sella turcica* (*vide* fig. 3, p. 467); it at once sends a branch backwards (25), which probably anastomoses with that of the other side. This vessel, the only representative of a basilar artery, runs backwards in a groove on the upper surface of the basisphenoid, supplying the medulla; the artery on the right side is considerably larger than that on the left. The next large branches are distributed on the outer surface of the optic lobes and the hemispheres; and finally the artery divides into the middle cerebral (28) and the ethmoidal (26). The latter soon enters the orbit, where it has been already described as anastomosing with branches 14 and 15. It helps to supply the olfactory mucous membrane, and gives offsets to the bony expansion on the top of the head and the skin in front of the eye (29).

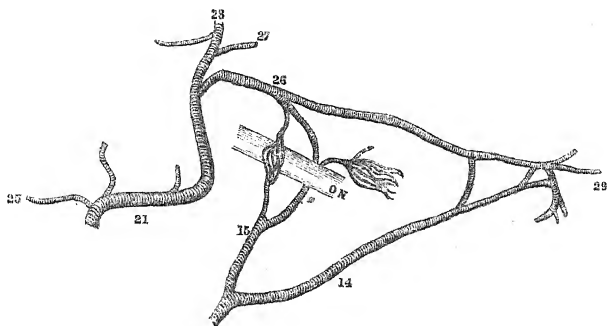
The principal differences between the arteries of the head in *Bucorvus* and those of birds generally are therefore:—1st, the absence of any considerable superior thyroid artery; this vessel is replaced by branches from the *comes nervi vagi*. 2nd, the absence of any artery which could be called facial. Its place is taken by branches from the maxillary plexus and from the ophthalmic artery. It may be added that Barkow calls that artery facial which, following Bauer's description, I have named internal maxillary; also that the artery which Barkow names ethmoidal Owen calls ophthalmic, and Bauer internal ophthalmic. In this case, and in the names given to all the other branches to the head, I have used those which were originally employed by Barkow.

I have not attempted to suggest any theory to account for the

singular fact that in this bird, and in this bird alone, so far as is at present known, such a remarkable event should occur as the complete obliteration of the principal vessels for the supply of the head.

The presence of two quite distinct vestiges of the missing arteries, in the shape of the two fine cords, which have been already described, would seem to indicate that this obliteration must have occurred after the arteries in question had been fully formed and for some

Fig. 3.



Plan of the internal carotid and its branches, with the arteries in the orbit (enlarged). Right side.

time in use. The manner in which the obliterated cord joins the vertebral artery above suggests that the vessel from which the internal carotid springs was originally a direct continuation of the common carotid trunk. And the alteration that would be necessitated by the obliteration of the main artery would be simple. The vessel which extends from 10 to the vertebral canal would then have been the occipital, which normally should anastomose with the vertebral in this position, while the part from 10 to 2 would be the external carotid, giving the usual branches. It seems probable therefore that at some time in the history of this bird the distribution of its vessels differed but little from that usually met with; but this fact perhaps adds to the difficulty of accounting for the change that has taken place. The theories hitherto proposed to account for such obliterations of the vessels of the neck in birds have only dealt with a change affecting one side of the body. This is the only instance which I am acquainted with of the symmetrical closure of two such important arteries at a period which, if I am correct in my supposition, was subsequent to their full development and functional activity.

## 2. On the Specific Identity of the British Martens.

By EDWARD R. ALSTON, F.L.S., F.Z.S., &amp;c.

[Received May 20, 1879.]

Two European species of Martens have been generally recognized by naturalists since the days of Albertus Magnus and Agricola, although some writers, including Linnæus himself, regarded them as identical. It is only of late years, however, that their specific distinctness has been finally proved; and before considering the question of the identity of the British Martens, it will be well to point out the true synonymy and diagnostic characters of the species in question, concerning which some confusion still appears to exist.

Several systematic writers, especially in Germany and America, have assigned the Linnæan title *Mustela* to the Martens instead of to the more truly typical Weasels, on the ground that this had been done by Cuvier. But the names *Putorius* and *Mustela* were only employed by the great French zoologist to mark *sous-genres*, and were not used binomially to indicate distinct genera<sup>1</sup>. The first definite separation was made three years later by Nilsson, who gave the generic title of *Martes* to the present group<sup>2</sup>; and thus both priority and propriety sanction the restriction of the name *Mustela* to the true Weasels and Ermines. There has also been some difference of opinion as to the specific name which should properly be given to the *Mustela martes* of Linnæus. Many writers have employed *abietum*, apparently on the ground that it was used as a varietal name by Linnæus himself. This, however, is not the case: the varieties *abietum* and *fagorum* were not accepted by him; he merely says that such a distinction was recognized by the peasants<sup>3</sup>. Moreover, if *abietum* be used, the universally known name of *foina* for the allied species would have to be withdrawn in favour of *fagorum*. The earliest equivalent to *Mustela martes* appears undoubtedly to be Nilsson's *Martes sylvatica*; and the synonymy of the two species should therefore stand thus:—

## I. MARTES SYLVATICA.

- Mustela martes*, Linnæus, Syst. Nat. (12th ed.), i. p. 67 (1766).
- Martes sylvatica*, Nilsson, Faun. Skand. (1st ed.) i. p. 41 (1820).
- *vulgaris*, Griffith, Cuvier's An. Kingd. v. p. 123 (1827).
- *abietum*, Fleming, Brit. Animals, p. 14, ex Ray (1828).
- *sylvestris*, Nilsson, Faun. Skand. (2d ed.) i. p. 171, ex Gesner (1847).

<sup>1</sup> 'Règne Animal' (1<sup>re</sup> éd., 1817), i. pp. 147, 199.

<sup>2</sup> Skand. Fauna (1st ed. 1820), i. p. 41. The genus *Martes* has been quoted by Lilljeborg and some others as instituted by "G. Cuvier, 1797;" this error appears to have originated in a misunderstanding of the French plural *Martes* in the 'Tableau Élémentaire.'

<sup>3</sup> "Varietas duplex rusticis: *Fagorum gutture albo*; *Abietum gutture flavo*." Syst. Nat. (12th ed.) i. p. 67.



## II. MARTES FOINA.

*Mustela foina*, Erxleben, Syst. Reg. An. p. 458 (1777)<sup>1</sup>.

*Martes foina*, Nilsson, Faun. Skand. (1st ed.) i. p. 38 (1820).

— *fagorum*, Fleming, Brit. Animals, p. 14, ex Ray (1828).

The cranial and dental characters by which *Martes sylvatica* and *M. foina* may be recognized were first pointed out by Dr. R. Hensel in 1853<sup>2</sup>, further elaborated by Blasius in 1857<sup>3</sup>, and recently revised by Dr. Elliott Coues in comparison with their American congeners<sup>4</sup>. At various times I have carefully compared the descriptions of these writers with a great number of skulls; and although many of the distinctions which they have pointed out are merely comparative, and though some of them prove to be inconstant when a large series of specimens are examined, yet I have never found the slightest difficulty in separating the species by the following external and internal characters:—

*Martes sylvatica*. Outer fur rich dark brown, under-fur reddish grey, with clear reddish-yellow tips; breast-spot usually yellow, varying from bright orange to pale cream-colour or yellowish white. Breadth of the skull (see fig. 2, p. 471) across the zygomatic arches rather more than half the length; the arches highest posteriorly, whence they slope rather suddenly downwards and forwards. Sides of muzzle nearly parallel; anterior opening of nares oval; postorbital process about equidistant between the frontal constriction and the anterior root of the zygoma. Palate comparatively narrow, with a distinct azygos process on its posterior margin. Upper premolars placed regularly in the line of the series; the fourth as long as the upper molar is broad, its inner cusp large and placed nearly at right angles to the axis of the tooth. Upper molar broader than long, its flattened inner portion considerably longer and larger than the outer part; in the latter the external tubercle fills the space between the anterior and posterior tubercles, so that the external outline of the tooth is simply convex, *not* emarginated. First lower molar with a slightly developed inner tubercle at the base of the main cusp.

*Martes foina*. Outer fur dull greyish brown, under-fur greyish white; breast-spot smaller than in *M. sylvatica*, pure white. Breadth of the skull (see fig. 1, p. 470) across the zygomatic arches much more than half the length; the arches regularly curved, broadest and highest near their middle. Sides of muzzle slightly converging; anterior opening of nares broader than in *M. sylvatica*, heart-shaped; postorbital process nearer to the frontal constriction than to the anterior root of the zygoma. Palate comparatively broad, truncated posteriorly. Upper premolars crowded, and often placed diagonally, their anterior extremities being directed inwards; the fourth considerably longer than

<sup>1</sup> Dr. Elliott Coues, in his 'Fur-bearing Animals' (p. 77) gives *M. foina* as instituted by "White, Phil. Trans. lxiv. 1774, 196", having seemingly been misled by some reference to Gilbert White's celebrated Monograph of the House-Martin (*Hirundo urtica*)!

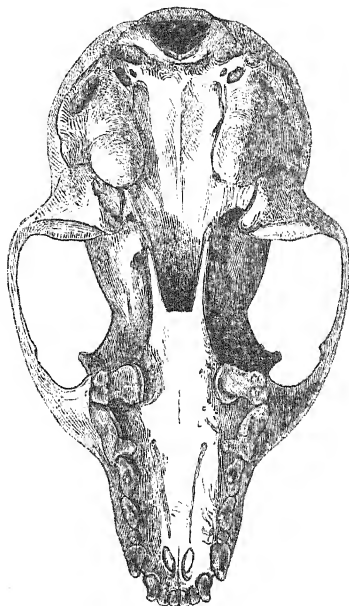
<sup>2</sup> Arch. f. Naturg. xix. i. pp. 17-22, pl. ii.

<sup>3</sup> Säugeth. Deutschl., pp. 211-219.

<sup>4</sup> Fur-bearing Animals, pp. 74-80, pls. iii., iv.

the upper molar is broad; its inner cusp smaller, and placed more diagonally than in *M. sylvatica*. Upper molar subquadrate, its flattened inner portion hardly longer or larger than the outer part, in which the external and anterior tubercles are placed close together, the external outline of the tooth being distinctly emarginated between them and the posterior tubercle. First lower molar with a well-developed inner tubercle at the base of the main cusp.

Fig. 1.

Skull of *M. foina*.

As Blasius has remarked, the differences of proportion are less conspicuous when a skull of an aged example of *M. foina* is compared with that of a young *M. sylvatica* than when individuals of the same age are contrasted; nevertheless they are always present to an appreciable degree. In his figures Blasius has represented a further distinction, in the form of the transverse ridges of the soft palate; but I have not had an opportunity of testing the constancy of this feature; nor have I sufficient materials for any original observations on the distinctive marks of the American and Siberian Martens, as to which I can only refer the reader to the descriptions of Drs. Coues<sup>1</sup> and Middendorff<sup>2</sup>. On the whole it may be said

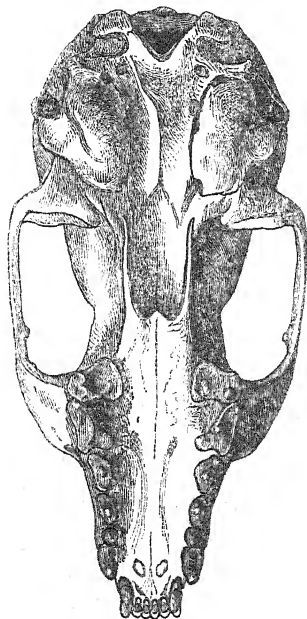
<sup>1</sup> Fur-bearing Animals, pp. 59-96, pls. ii., iv.

<sup>2</sup> Reise in Sibir., ii. Th. ii. pp. 68, 69, pl. ii. figs. 1-6.

that the most striking and trustworthy of the characters enumerated above are, *externally*, the colour of the under fur, and, *internally*, the comparative breadth of the skull and the shape of the upper molar<sup>1</sup>.

Having thus cleared the ground as to the synonymy and distinguishing marks of the two European Martens, we come to the question whether both of them inhabit our own islands. Every

Fig. 2.



Skull of *M. sylvatica*.

work hitherto published on the British fauna has either stated or assumed that both forms are natives; and almost every one has represented the white-breasted *Martes foina* (the Common Marten of the Continent) as being also the prevailing species in Britain. Several, however, of our best zoologists have expressed grave doubts as to the specific distinction of the two forms, or have even denied that they could be separated as constant varieties. This will be evident from a glance at the pages of the principal writers on the subject.

<sup>1</sup> It should be observed that Dr. Severtzoff has stated that our European Martens are "not fully differentiated" in Eastern Turkestan, and has described some skins which he saw there as a new species, *Mustela intermedia* (Turkestanische Jevotnie, p. 80; Ann. & Mag. Nat. Hist. 4th ser. xviii. p. 46); but as he obtained no skulls, much weight cannot be laid on his observations.

Passing over the older writers, who merely copied the accounts of Gesner and Aldrovandus, we may come at once to Pennant, who describes *Mustela foina* as "The Martin," distinguishing "The Yellow-breasted Martin" as a distinct species, of which he says that it "is found in *Great Britain*; but is much less common in *England* than the former; it is sometimes taken in the counties of *Merioneth* and *Caernarvon*, where it is distinguished from the other kind by the name of *bela goed*, or Wood Martin, it being supposed entirely to inhabit the woods, the *bela graig* to dwell only among the rocks. Though this is so rare in these parts, yet in *Scotland* it is the only kind; where it inhabits the fir forests, building its nest at the top of the trees" <sup>1</sup>.

Pennant was followed by subsequent writers without much additional information being supplied. Thus Bingley states that the "Common Martin" is "not very uncommon in many of the southern parts of Great Britain and Ireland;" while "Pine Martins are sometimes, though rarely, observed in the wooded and thinly inhabited districts of Wales and Scotland, and two or three of the northern counties of England" <sup>2</sup>.

Fleming gives the habitat of *Martes fagorum* as "In woods and rocks in the south of Scotland and England;" that of *M. abietum*, "in the wooded districts of Wales and Scotland;" but adds that "the characters of these two species are ill-defined" <sup>3</sup>.

The Rev. L. Jenyns in his excellent 'Manual' considered that *Mustela foina* was "more generally diffused" than *M. martes*, which, he says, "inhabits the fir-woods of Scotland: occurs also sparingly in the west of England" <sup>4</sup>.

Edward T. Bennett, then Secretary of this Society, discussed the question of the distinction of the Beech and Pine Martens in 1835, evidently inclining to the belief that they were specifically identical, and referring two British specimens then in the Society's Museum to the former and two others to the latter race <sup>5</sup>. What was the ultimate fate of these examples I know not; but it is to be remarked that no exact localities are mentioned, and that the supposed "Beech Martens" had "dirty-white breasts:" not improbably they were faded specimens.

Two years later appeared the first edition of Mr. Bell's standard work, in which he gave separate figures and descriptions of the two Martens, but "with the precaution of a protest against being considered as decidedly supporting the opinion that they are essentially different." No new information was here given as to the supposed distribution of the animals in this country <sup>6</sup>. In Scotland, however, the elder Macgillivray had better opportunities for observation, and a comparison of specimens convinced him of "the indivisibility of the species." Young specimens, he says, have yellow throats, and

<sup>1</sup> Brit. Zoology, 1768, i. p. 81.

<sup>2</sup> Mem. Brit. Quad. (1809), pp. 164, 169.

<sup>3</sup> Hist. Brit. Anim. (1828), pp. 14, 15.

<sup>4</sup> Man. Brit. Vert. An. (1835), p. 11.

<sup>5</sup> Gard. and Menag. of the Zool. Soc. (1835), i. pp. 227-240.

<sup>6</sup> Brit. Quadr. 1st ed. (1837), pp. 167-176.

are the Pine Martens of authors; while "in old individuals the whole fore-neck and part of the breast are white, or greyish white, or pale grey mottled with brownish. The yellow colour on the throat fades in specimens kept in Museums, so as at length to be scarcely perceptible"<sup>1</sup>. In Ireland W. Thompson came to similar conclusions, observing that "all the native specimens which have come under my own notice were yellow-breasted (*Martes abietum*), with the exception of one, which had the breast white (*M. foina*), and was killed in the county of Antrim." He adds that he had long since remarked that the yellow colour gave place to white with advancing age, and explained the greater number of yellow-breasted specimens obtained by their comparative immaturity<sup>2</sup>.

The author who has most recently treated of the question is Mr. Bell. In his revised second edition of the 'Quadrupeds' he fully accepts the specific distinction of the two forms, regarding which he was formerly so doubtful, and quotes a letter from Mr. R. T. Vyner, who "concludes that the Beech Marten is at present much less common than the Pine, and is, indeed, very nearly extinct in England, which is accounted for by its habit of leaving its summer haunts of woods and rocky places, to inhabit, in the winter, farm buildings, faggot-stacks, and other similar localities, and thus becoming exposed to various means of destruction. The Pine Marten, on the contrary, continues to inhabit, at all seasons of the year, its accustomed retired haunts, rarely, if ever, intruding into the immediate purlieus of human habitations"<sup>3</sup>.

It will thus be seen that the later and better-informed English faunists gradually approached agreement as to the existence of only one species of Marten in Britain, and that some of them drew the natural though erroneous deduction that *Martes sylvatica* and *M. foina* were specifically identical. The fact is, as I believe, that *M. foina* is not, and never was, a member of the British fauna. During the last ten years I have missed no opportunity of examining native Martens, and have endeavoured to trace out every supposed "Beech Marten" that I could hear of. I have thus seen a very large number of specimens from various parts of England, Wales, Scotland, and Ireland; and every one has proved to be *M. sylvatica*. The late Mr. Blyth, who paid some attention to this question, assured me, shortly before his death, that his investigations had led him to the same result; and I have been unable to find any competent observer acquainted with the true characters of the species, who has ever seen an authentic British-killed specimen of *M. foina*. Macgillivray and Thompson were certainly correct in saying that the pale-chested individuals which have usually received that name in this country are merely aged examples of the Pine Marten, or specimens which have faded in museums. Nor does there appear to be the slightest evidence in favour of Mr. Vyner's suggestion that *M. foina* has been recently exterminated in this country. Such a fate has not overtaken the species on the Continent, where it holds

<sup>1</sup> Brit. Quadr. (Nat. Libr. xx. 1838), pp. 166-173.

<sup>2</sup> Nat. Hist. Ireland (1856), iv. p. 9. <sup>3</sup> Brit. Quadr. 2nd ed. (1874), p. 212.

its own fully as well as its ally; and a subfossil skull found in Burwell Fen, Cambridgeshire, and exhibited to this Society in 1873, by Mr. J. W. Clark<sup>1</sup>, is certainly referable to *M. sylvatica*. The true Beech Marten is undoubtedly a more southern species than its congener, finding its northern limits in Denmark and the Baltic Provinces; for Professor Lilljeborg has proved that it is not, as had been stated, a native of Sweden<sup>2</sup>. Until an authentic British specimen has been produced, it must also, I think, be struck out of the lists of the British fauna.

I will conclude with a few remarks on the present distribution of the Pine Marten in Britain, much of the information being gleaned from the pages of the 'Zoologist.' Although greatly reduced in numbers by persecution, it still maintains its ground in the wilder districts of Scotland, the north of England, Wales, and Ireland, and occasionally specimens are killed in counties where the species was thought to have been long extinct. In Scotland it is still found, though comparatively rarely, in the Lews and in most of the Highland mainland counties, being perhaps most abundant in Sutherland and Ross-shire, especially in the deer-forests. In the Lowlands a Marten is now a very great rarity; but a fine example was killed in Ayrshire in the winter of 1875-76. In the north of England, Mr. W. A. Durnford says<sup>3</sup>, the species is "still plentiful;" in the wilder parts of Cumberland, Westmoreland, and Lancashire, and in Lincolnshire, several have been recorded, the latest, killed in 1865, by Mr. Cordeaux<sup>4</sup>. In Norfolk one was shot last year<sup>5</sup>; and I have myself examined a fine example, which was shot in Hertfordshire, within twenty miles of London, in December 1872. In Dorsetshire the last is said to have been killed in 1804<sup>6</sup>; but a specimen occurred in Hampshire about forty years ago<sup>7</sup>, and another in Surrey in 1847. A Marten is said, by the Rev. C. A. Bury, to have been "seen" in the Isle of Wight<sup>8</sup>; and one was recorded from Cornwall, by Mr. E. Hearle Rod<sup>9</sup>; but this proves on investigation to be an error, the specimen having been brought from North Wales, where Martens appear to be still not very rare. In Ireland the following counties were enumerated by Thompson as habitats of this species—Donegal, Londonderry, Antrim, Down, Armagh, Fermanagh, Longford, Galway, Tipperary, Cork, and Kerry<sup>10</sup>. The *Cat-crann* is probably now a rarer animal in Ireland than it was when Thompson wrote; but it still exists in various districts, especially in co. Kerry, whence the Society has received several living examples; and Professor A. Leith Adams states that it has been seen of late years even in co. Dublin<sup>11</sup>.

<sup>1</sup> P. Z. S. 1873, p. 790.

<sup>2</sup> Sverg. og Norg. Ryggradsdjur, p. 535.

<sup>3</sup> Zoologist, 1877, p. 291.

<sup>4</sup> Zoologist, 1866, p. 242.

<sup>5</sup> F. Norgate, 'Zoologist,' 1879, p. 172; J. H. Gurney, *tom. cit.*, p. 210.

<sup>6</sup> J. C. Mansel-Pleydeil, *tom. cit.*, p. 171.

<sup>7</sup> P. L. Selater, 'Zoologist,' 1845, p. 1018.

<sup>8</sup> Zoologist, 1844, p. 783.

<sup>9</sup> Zoologist, 1878, p. 127.

<sup>10</sup> Nat. Hist. Irel. iv. p. 9.

<sup>11</sup> Proc. R. Soc. Dubl. 1878.

3. On the Terrestrial Mollusca collected in Costa Rica by the late Dr. W. M. Gabb, with Descriptions of new Species. By GEORGE FRENCH ANGAS, C.M.Z.S., F.L.S., &c.

[Received May 26, 1879.]

(Plate XL.)

At the request of Mr. Thomas Bland, of New York (who has obligingly forwarded to me for examination the collection of land-shells made in Costa Rica by the late Dr. Gabb), I have undertaken, as far as practicable, to give in the following paper a list of the species obtained in that country by Dr. Gabb, together with descriptions of such as appear to be new to science.

Mr. Bland has also been good enough to furnish me with notes regarding the habitats of the various species, together with drawings of several of the animals, taken from nature by Dr. Gabb; and these he has supplemented with some important remarks of his own. Although in some instances the number of specimens of a species sent is sufficient to form a good series for critical examination, in others there are but one or two examples available; therefore where there is any doubt in determining a species it will be marked with a ?. Through the liberality of Mr. Thomas Bland I have been enabled to place the type specimens (together with examples of most of the species sent), in the national collection in the British Museum.

Previous to Dr. Gabb's decease, several of the Mollusca collected by him in Costa Rica, and preserved in spirits (together with his original drawings of the animals), were submitted by him to Mr. W. G. Binney for examination. In a paper just published in the 'Annals of the New York Academy of Sciences' (vol. i. pl. 11), Mr. Binney gives descriptions and figures of two new genera and species, viz. *Velifera gabbi* and *Cryptostrakon gabbi*. He also figures the lingual dentition and the animals in motion. Furthermore, he figures the animals and the lingual dentition of *Limax semitectus*, Mörch, and of a species of *Tebennophorus*, which he supposes to be *T. costaricensis* of Mörch.

The species placed in my hands by Mr. Thos. Bland are as follow, viz. :—

1. *HELIX* (*OXYCHONA*) *ZHORQUINENSIS*, n. sp. (Plate XL. fig. 1.)

Shell scarcely rimate, conically trochiform, rather thin, under the lens very minutely transversely shagreened upon the lower whorls and on the base, pale yellowish green, with a single narrow chocolate band in the middle of the three or sometimes four lower whorls, and a still narrower band of the same colour next below the sutures; whorls 6, nearly flat, sharply keeled at the periphery; sutures, the last three keeled and white; nucleolar whorls nearly smooth and shining, with a purplish-black line at the sutures, and spreading over

the apex, which is somewhat obtuse; base very slightly convex; aperture very oblique, subquadrate; outer lip expanded and sinuous above, with a produced horizontal beak at the periphery, arcuate and somewhat reflexed below.

Diam. maj.  $13\frac{1}{2}$ , min. 10, alt. 10 lin.

*Hab.* Along the Zhorquin river, Costa Rica.

"Animal very slender, nearly white, pale brownish on head and top of body" (*Gabb*).

Five adult and three young specimens found, all of the same coloration.

This very remarkable and elegant shell is the gem of the collection. It belongs apparently to the same section as *H. bifasciata* from Brazil.

2. *HELIX* *ÆSOPUS*, Angas, P.Z.S. 1878, p. 72, pl. 5. figs. 11, 12.

Some of the specimens show a dark band round the umbilical region, and are larger than the type specimen figured in the Zoological Society's 'Proceedings,' whilst one of them shows traces of concentric lines, especially towards the front of the last whorl.

The nearest ally to this species is *H. triplicata*, Martens, which, however, is smaller, and differs in the shape of the peritreme.

"The animal is grey above, with the foot nearly white" (*Gabb*).

Found in the coast region and to the hills of Uren, at an altitude of 3000 feet. The type specimen was found at Buena Vista at a similar altitude.

Seventeen specimens found, five only unbleached.

3. *HELIX* *MAC-NEILI*, Crosse, Journal de Conch. vol. xxi. p. 67.

Of this small species only three fresh specimens and a few dead ones were found.

"Animal dark brown; tail and foot slightly lighter; upper tentacles long" (*Gabb*).

Coast region and lower hills, from Parismina to the hills of Zhorquin.

4. *HELIX* *COSTARICENSIS*, Roth; Pfr. Mon. Hel. iv. p. 302; Pfr. Novitat. i. 21. 15-17.

This is an extremely variable species, both in colour and form as well as in size; still I cannot detect in the series before me any differences that would amount to specific characters. The base is invariably white, with a dark-brown umbilicus, and the umbilical region tinged with bright yellow. The three principal varieties appear to be:—1st, large, depressed, white, with two or three narrow dark-brown bands; 2nd, small, depressed, with the upper surface light or dark brown throughout, or zoned with both colours; 3rd, medium in size, much more conical, with two broad bands of light brown, or all light brown above. This last variety was described by me in this Society's 'Proceedings' for 1878, under the name of *Helix boucardi*, from specimens brought home by Mons. Boucard from the region



of Navarro, and found on the leaves of trees. I now consider it (after a careful examination of all the specimens) to be an extreme variety of *H. costaricensis*.

"Animal dark grey above, foot white," (*Gabb*).

High hills only; commonest in Cabecar.

About a dozen living and a number of dead specimens found, varying in size and coloration.

5. *HELIX* (*SOLAROPSIS*) *TILORIENSIS*, n. sp. (Plate XL. fig. 2.)

Shell minutely and profoundly umbilicated, depressedly globose, thin, ornamented with oblique transverse rows of minute granules, from which spring very short, erect, dark brown bristles; pale brown, with one narrow band of dark chestnut towards the basal portion of the last whorl, and another similar band above near the suture—the space between it and the suture, as well as the upper whorls, being crossed with wavy dark chestnut markings, whilst the central portion of the body-whorl is ornamented with light brown transverse angular markings that form a very narrow indistinct band in the middle of the whorl. Whorls  $4\frac{1}{2}$ , the last very large and rounded, the upper whorls flat; spire concavely depressed; aperture broadly crescent-shaped; outer lip arcuate, a little reflexed; columellar margin slightly expanded over the umbilicus.

Diam. maj. 9, min.  $7\frac{1}{2}$ , alt. 5 lin.

*Hab.* Hills between the rivers Tilorio and Zhorquin.

Only three specimens found.

This species comes nearest to *H. andicola*, Pfr., from South America; but the latter has the spire raised above the plane of the last whorl, the granules much more numerous, and not set in regular oblique rows, and has also a different style of coloration.

6. *BULIMUS* *GABBI*, n. sp. (Plate XL. fig. 3.)

Shell imperforate, somewhat elongately ovate, moderately solid, faintly, obscurely, longitudinally striated, shining, straw-colour; the entire peritreme bright rose-colour; whorls 5, convex; spire shorter than the aperture; aperture large, effuse, oblique; outer lip somewhat thickened and expanded.

Var. *a.* Pinkish brown, obscurely banded with darker brown, and freckled and spotted with white.

Var. *b.* Opaque white, marked with a few irregular bands of dark brown arrow-shaped spots.

Var. *c.* White, with two or three brown bands spotted with white.

Diam. 7, alt.  $10\frac{1}{2}$  lin.

*Hab.* On the ground, upon the flanks of Pico Blanco, at an altitude of from 3000 to 6000 feet.

"Foot broad, pointed, and very flat. Animal varies with the colour of the shell from white to ash-colour, greenish white, or light brown" (*Gabb*). (Plate XL. fig. 3 *a.*)

This pretty species was sent as "*B. irazuensis*?", Angas," but is totally distinct from it, the only character in common being the rose-coloured peritreme.

7. *BULIMUS JOSEPHUS*, Angas, P.Z.S. 1878, p. 73, pl. 5. figs. 13, 14.

Very few specimens found.

"On the lower hills, Talamanca" (*Gabb*).

My type specimens were obtained on the trunks of acacia trees, San José, Costa Rica.

8. *BULIMUS ATTENUATUS*, Pfr. Mon. Hel. iii. p. 336; Chemn. ed. Nov. 30. 9, 10.

"Dota, a high hill region south of San José" (*Gabb*).

This species is closely allied to *B. costaricensis*, Pfr., but is more elongated, and has a twist on the columella, with a somewhat different style of painting.

Three specimens only.

9. *BULIMUS COSTARICENSIS*, Pfr. Mon. Hel. vi. 47; Novitat. iii. 95. 11, 12.

Costa Rica.

The specimens are all poor and in bad condition.

10. *BULIMUS TRIPICTUS*, Albert, Mal. Blätt. iv. 1857, p. 97; Pfr. Mon. Hel. iv. p. 48.

*B. rhodotrema*, Martens, Mal. Bl. 1868, p. 156; Pfr. Novitat. iii. 101. 10, 11.

Costa Rica. A very beautiful little, thin, globose species, pale greenish yellow, ornamented with three dark-brown transverse bands of oblique stripes and spots, with the lip and columella rose-colour.

11. *BULIMUS ZHORQUINENSIS*, n. sp. (Plate XL. fig. 4.)

Shell somewhat broadly perforate, elongately ovate, moderately solid, rather coarsely and irregularly obliquely striated, especially towards the base of the last whorl, crossed here and there with single or double narrow impressed lines, between which are rows of numerous short descending striæ; whitish or pale brown, painted with narrow, distant, longitudinal darker brown flames; whorls 7, rather convex; spire sharply conical; sutures impressed; apex straw-coloured; aperture large, ovate, effuse, pale lilac-brown within; outer lip white, very much expanded, flattened and a little recurved; columella triangularly flattened and expanded over the umbilical region, ending in a blunt rounded callus interiorly.

Diam. 12, alt. 23 lin.

*Hab.* "Middle Zhorquin to Cuabre, low hills and flat ground" (*Gabb*).

This fine shell (of which only three specimens were obtained) resembles *B. expansus*, Pfr., in shape, but wants the sharp longitudinal sculpture and the dark purple mouth. It is also allied to *B. pallidior*, Sow., from "Central America;" but that shell is entirely white, and with a much less expanded lip. It is somewhat like *B. excelsus*, Gould, which, however, is much narrower, and has

a smaller lip and is of a brown colour, with distant white longitudinal zones. Another of the same group is *B. lilacinus*, Ree., also from "Central America," which is white, with violet columella; and still another is *B. liliaceus*, Guild., which is from the West Indies, and is a less solid shell, more contracted, with the aperture less rounded at the base, has a pink tinge, and a much smaller umbilicus, and the outer lip not nearly so much expanded as in *B. zhorquinensis*.

12. *BULIMUS CITRONELLUS*, n. sp. (Plate XL. fig. 5.)

Shell elongately ovate, minutely perforated, rather thin, very finely and closely transversely sculptured with delicate impressed striæ, pale yellow or citron-colour throughout; whorls 7, flatly convex; apex conical; sutures impressed, white; aperture ovate; outer lip thin, slightly expanded towards the base; columella triangularly flattened over the perforation.

Diam. 6, alt. 12 lin.

*Hab.* "Uren to Lipurio, low hills" (*Gabb*).

"Animal white; upper tentacles very long; arboreal" (*Gabb*).

Only two specimens.

13. *BULIMUS MACULATUS*, Lea, Trans. Am. Phil. Soc. 1839, p. 86, pl. 22. fig. 112.

Costa Rica.

The specimen in the British Museum is from Chiriqui Mountain, "Central America."

A small elongate species, pale yellow, banded with light and dark purplish brown.

14. *BULIMUS CORNEUS*, Sow.

Shell rimate, ovate, rather thin, irregularly finely obliquely striated, pale brown throughout; whorls 6, moderately convex; spire equal in length to the aperture; sutures impressed; aperture ovate; outer lip thin, simple; columellar, margin slightly expanded over the perforation; margins united by a thin callus.

Diam. 5, alt. 9 lin.

*Hab.* Tilorio and Zhorquin rivers" (*Gabb*).

"Animal small, yellowish white; tail does not reach to the apex of the shell; tentacles short, dark" (*Gabb*).

A small species of simple aspect, of a uniform pale-brown colour, allied to *B. behrendti*, Pfr.

15. *GLANDINA LIGNARIA*, Reeve.

*Achatina lignaria*, Reeve, Conchol. Icon. *Achatina*, pl. 8. fig. 27 (1849).

*Glandina sowerbyana*, form A, Strebel, Mexik. Land- und Süßw.-Conch. ii. Taf. v. figs. 10 a, 10 b.

*Euglandina lignaria*, Crosse et Fischer, Expéd. Scient. du Mexique, Mollusca, pl. 3. fig. 1.

Two specimens found.

"Only in high country, as high as 6000 feet, Costa Rica" (Gabb).

Dr. Gabb gives the following notes respecting the animal:—"Head and appendages and all the upper surface black; upper margin of foot yellowish brown. Entire surface granulated and corrugated. A groove around the anterior and inner base of each upper tentacle, becoming parallel and running posteriorly to the shell, leaving a median linear ridge. Lateral appendages in part retractile, and, when at rest, curved backwards against the sides of the head. Their front edges acute, posterior edges thicker and rounded. On expanding, first the upper tentacles are protruded, then the lower, and finally the lateral appendages. Sole of the foot perfectly black. On being disturbed the animal withdraws into the shell, all except the foot, which remains outside with its edges corrugated. Doubtless in dry weather the whole could be retracted; but the specimen which I drew could not."

16. *GLANDINA SOWERBYANA*, Pfr.

*Achatina* (*Glandina*) *sowerbyana*, Pfr. P.Z.S. 1846, p. 32.

*Achatina sowerbyana*, Reeve, Conch. Icon. *Achatina*, pl. 8. figs. 26 a & b.

*Glandina sowerbyana*, form B, Strebel, Mexik. Land- und Süssw.-Conch. ii. Taf. v. A. fig. 10 m.

Only two specimens found.

Although Strebel considers *G. lignaria*, Reeve, to be only a variety of this species, I am inclined, with MM. Crosse and Fischer, to regard it as distinct. *G. sowerbyana* is much more ovate, has a shorter spire and a larger aperture, with a coarser granulated sculpture and a more solid texture than *G. lignaria*, which is more fusiform, thinner, and very finely granulated. The same differences of character are also strongly marked in the young shells.

Locality similar to that of the last species.

17. *GLANDINA AURATA*? Morelet.

*Glandina aurata*, Morelet, Test. Noviss. i. no. 20, p. 12 (1849).

*Glandina aurata*, Crosse et Fischer, Expéd. Scient. du Mexique, Mollusca, pl. 3. figs. 7, 7a.

Costa Rica.

Only one specimen obtained, with the living animal (Plate XL. fig. 6.)

This shell is more like *G. aurata* of Morelet than any other; indeed I cannot detect any specific difference.

18. *GLANDINA ISABELLINA*, Pfr., var.

*Achatina isabellina*, Pfr. P.Z.S. 1846, p. 32; Reeve, Conch. Icon. *Achatina*, pl. 21. fig. 95.

"Several specimens met with, but few in good condition. Rare; from the hills, Costa Rica" (Gabb).

This appears to be a variety of *G. isabellina*, Pfr., with the last

whorl somewhat broader and the aperture more effuse than in the Mexican specimens in the British Museum. This species is allied to *G. conularis*, Pfr., and *G. obtusa*, Pfr., the former of which is from Mexico, and the latter from Nicaragua. The Costa-Rica specimens are larger than the typical ones. The delicate concentric lines (seen through the lens) by which the whorls are crossed are characteristic of this species.

The animal, which is of the same pale isabelline colour as the shell, is entirely retractile.

19. *GLANDINA AURANTIACA*, n. sp. (Plate XL. fig. 8.)

Shell fusiformly oblong, moderately thin, smooth, shining, bright tawny orange, darker towards the base of the columella; whorls  $5\frac{1}{2}$ , slightly convex; spire papillose, obtuse; sutures impressed, and of a dark purple colour; columella slightly oblique, shortly truncated in front; outer lip moderately arcuate, simple, not effuse towards the base; aperture elliptically oblong, half the length of the shell, pale rosy purple within.

Diam. 5 alt. 11 lin.

"From the hilly country," Costa Rica.

This species, of which only a single example was found, is somewhat allied to *G. isabellina*, Pfr., but is smaller, of a different colour and texture, and quite smooth, with no traces of the fine concentric lines characteristic of that species; and, moreover, it has the sutures banded with purplish brown.

20. *GLANDINA (OLEACINA) ANOMALA*, n. sp. (Plate XL. fig. 9.)

Shell elongately oblong, turreted, thin, shining yellowish olive-green, dark brown towards the apex; whorls 7, very slightly convex, flatly longitudinally striate, the striæ becoming obsolete towards the lower portion of the whorls, especially on the last; spire very large and obtuse; apex rounded, tumid; sutures strongly granulated; columella very slightly arcuate; outer lip simple, nearly straight; aperture small, much shorter than the spire, narrowly subquadrate.

Diam. 6, alt.  $17\frac{1}{2}$  lin.

Hab. "Hilly regions," Costa Rica.

This species, which is allied to *G. turris*, Pfr., and *G. pseudo-turris*, Strebel, is remarkable for its large swollen obtuse spire and small aperture. The longitudinal striæ do not come quite down to the sutures, as in *G. turris*; and the sutures are strongly granulated.

21. *GLANDINA (OLEACINA) MITRIFORMIS*, n. sp. (Plate XL. fig. 10.)

Shell elongately ovate, turreted, moderately thin, shining, irregularly obsoletely striated, striæ finer and closer on the upper whorls, olive-chestnut, with a narrow yellow zone next below the suture; whorls 5, slightly convex, the last more than half the entire length of the shell; spire short, conical, apex rather obtuse; columella slightly arcuate; outer lip simple, nearly straight; margins united

by a callus; aperture elongately ovate, half the length of the shell, lilac within.

Diam.  $6\frac{1}{2}$ , alt. 14 lin.

Only one specimen.

*Hab.* "Middle Zhorquin to Cuabre (low hills and flat ground)" (*Gabb*).

22. *GLANDINA (OLEACINA) STREBELI*, n. sp. (Plate XL. fig. 11.)

Shell elongately ovate, thin, shining, finely longitudinally striated, the striae nearly obsolete on the last whorl, olive-green; whorls  $5\frac{1}{2}$ , slightly convex; spire elongately conical; apex rounded and blunt; sutures simply impressed; aperture narrowly elliptical; outer lip thin, nearly straight; columella arcuate, margins united by a thin callus.

Diam. 5, alt.  $11\frac{1}{2}$  lin.

*Hab.* "Middle Zhorquin to Cuabre (low hills)" (*Gabb*).

Not unlike *G. turris*, Pfr., but only half the length, narrower, more compressed at the base of the aperture, of a different colour, and with a less number of whorls.

23. *STREPTOSTYLA BOUCARDI*, Pfr., var.?

*Spiraxis boucardi*, Pfr., P. Z. S. 1861, p. 24.

This species approaches very near to *S. boucardi*, Pfr., of which I am inclined to consider it a variety.

Five specimens were found "on the ridge between Tilorio and Zhorquin" (*Gabb*).

"Animal light brown above, whitish below and posteriorly; tentacles dark brown; carries the tip of the tail slightly turned up in travelling" (*Gabb*).

This species must not be confounded with *S. bocourti*, Crosse & Fischer.

24. *STREPTOSTYLA VIRIDULA*, n. sp. (Plate XL. fig. 12.)

Shell ovate, thin, shining, longitudinally striate at the upper part of the whorls, the striae becoming almost obsolete on the lower half of the last whorl, pale yellowish green throughout; whorls 6, somewhat convex; spire conoidal; apex but slightly obtuse; sutures subcanaliculate; outer lip very slightly sinuous, nearly straight in the middle; columella strongly twisted and everted at the base; aperture subauriform, nearly two thirds the length of the shell.

Diam. 5, alt. 8 lin.

*Hab.* Hills of Uren, Costa Rica.

25. *STREPTOSTYLA CYLINDRACEA*, Pfr.?

*Achatina cylindracea*, Pfr., P. Z. S. 1846, p. 31; Reeve, Conch. Icon. *Achatina*, pl. 18. fig. 91.

As there is only a single specimen, I hesitate to identify it positively; but it comes nearer to *S. cylindracea* than to any thing else I can find.

Costa Rica.

## 26. ORTHALICUS ZEBRA, Müll.

*O. zebra*, Müll. Verm. terr. et fluv. Hist. 138; Reeve, Conch. Icon. *Bulimus*, pl. 15. fig. 90.

*Bulimus princeps*, Brod.

*Bulimus undulatus*, Brug.

*Bulimus zigzag*, Lam.

All poor and dead specimens.

"Rare, in the valley about Lipurio; 200 feet above the sea in Talamanca" (*Gabb*).

## 27. CYCLOTUS BOUCARDI, Angas.

*Cyclotus boucardi*, Angas, P. Z. S. 1878, pl. 5. figs. 3, 4.

Only a single specimen found, larger than the type, measuring 2 inches across.

"Mouth of Banana River, 5 miles from Limon" (*Gabb*).

## 28. CYCLOTUS IRREGULARIS, Pfr.

*Cyclotus irregularis*, Pfr. P. Z. S. 1855, p. 117.

A large number of specimens. "The commonest shell in Talamanca; coast region, and to 500 feet high on the hills" (*Gabb*). "Animal pinkish; tentacles bright red" (*Gabb*).

There are two well-marked varieties of this species:—one large (1 in. 10 lines across), bright chestnut, with a pale band at the periphery; the other smaller (1 in. 5 lines across), pale yellowish olive, with a narrow brown band at the periphery.

It is curious in how many specimens the lower margin of the peritreme appears to have been injured and repair commenced, giving the appearance of a second sinus. Of this remarkable injury, at different ages of the shell, Mr. Bland remarks:—"Examination at the outer edge of the peristome induces me to believe that the animal from time to time produces this injury by grazing, so to say, to satisfy a demand for lime."

## 29. CYCLOTUS DYSONI, Pfr.

*Cyclotus dysoni*, Pfr. P. Z. S. 1851, p. 243.

"Only on hills, not common" (*Gabb*); Cervantes, Costa Rica.

## 30. CYCLOTUS TRANSLUCIDUS, Sow.

*Cyclotus translucidus*, Sow.; Pfr., Monog. Pneumon. vi. vol. i. p. 20.

Eight specimens found, all of a somewhat dwarf form as compared with the type. "Lepanta" (*Gabb*).

## 31. CYCLOPHORUS LUTESCENS, Pfr., var.

*Cyclophorus lutescens*, Pfr. P. Z. S. 1851, p. 250; Chemn. Conch.-Cab. ed. 2, p. 333, pl. 43. figs. 12-14.

Very few specimens. "Lepanta, Nicoyo" (*Gabb*).

Curiously like *Cyclophorus wahlbergi*, Benson, from Zululand.

32. *HELICINA LINDENI*, Pfr.

*H. lindeni*, Pfr. Monog. Pneumon. Viv. vol. i. p. 388 ; Chemn. Conch.-Cab. ed. 2, p. 52, pl. 8. figs. 25, 26.

The specimens, of which three were found, are rather larger than the type, which is from Mexico. Costa Rica.

33. *HELICINA FUNKI*, Pfr., large var. (Plate XL. fig. 7, animal.)

*H. funki*, Pfr. Monog. Pneumon. Viv. vol. i. p. 361.

Many specimens. "Talamanca, all the coast region, and to the lower hills" (*Gabb*).

"Animal brownish white; head and lower tentacles white; animal very timid" (*Gabb*). Much larger than the type, which is from New Granada. Varies in colour from straw-yellow to orange.

34. *HELICINA LYRATA*, Pfr.

*Helicina lyrata* Pfr. Monog. Pneumon. Viv. vol. i. p. 341.

One specimen. Costa Rica.

35. *HELICINA BEATRIX*, n. sp. (Plate XL. fig. 13.)

Shell conical, solid, shining; as seen through the lens, very finely transversely striated; whorls 6, very slightly convex, the four uppermost chestnut, the fifth dark red, with an opaque whitish band below the suture, the last pale olive-green, with a similar opaque band at the suture; outer lip thickened, a little expanded and reflexed; aperture quadrately semilunate.

*Var.* Smaller and straw-coloured throughout.

Diam.  $4\frac{1}{2}$ , alt. 5 lin.

Very few specimens. "Found only on the hills up to an elevation of 2500 feet. Animal dark grey above, sides and foot white" (*Gabb*). Approaches *H. heloiseæ*, Sallé, but larger and much more conical.

36. *SUCCINEA UNDULATA*, Say.

*Succinea undulata*, Say, New Terrestrial Shells, p. 24.

"Coast region to lower hills" (*Gabb*). A dozen specimens. "Animal bright flesh-colour, robust, and marked by a few dark spots; lower tentacles very short" (*Gabb*).

37. *STENOPUS GUILDINGI*, n. sp. (Plate XL. fig. 14.)

Shell perforate, globosely conical, thin, shining, very finely obliquely striated, brownish ash-colour; whorls  $6\frac{1}{2}$ , convex, the last with a thread-like keel at the periphery; apex conical; sutures margined; base convex; aperture crescent-shaped; outer lip arcuate, simple, thin; columellar margin scarcely dilated.

Diam. 2, alt.  $1\frac{1}{2}$  lin.

*Hab.* Costa Rica.

This little species differs from *S. lividus*, Guild., in having the sutures margined with a strongly defined thread-like carina at the periphery, and one more whorl.



Altogether, in the eight collections transmitted by Mr. Salmon about 3500 specimens of birds have passed through our hands. Some of the new species contained in them have been already laid before the Society<sup>1</sup>. But in justice to Mr. Salmon's memory and in the interests of science, we have thought it right that some further record of so fine and extensive a series (embracing specimens of 468 species) from such a little-known locality should be made. We have therefore compiled the subjoined list of the birds represented in Mr. Salmon's collections, with an indication of the exact localities in which each species was obtained, and an account of the nest and eggs where sent.

Except in the case of some of the very commonest, examples of Mr. Salmon's species have been kept either for the collection of Sclater (Mus. P.L.S.), or for that of Salvin and Godman (Mus. S.-G.), as indicated in the subjoined list. The nests and eggs have been deposited in the British Museum.

We have incorporated into our list Mr. Salmon's valuable M.S. notes on the nests and eggs, and have appended his initials (T.K.S.) to them.

The following is a list of the species new to science discovered by Mr. Salmon :—

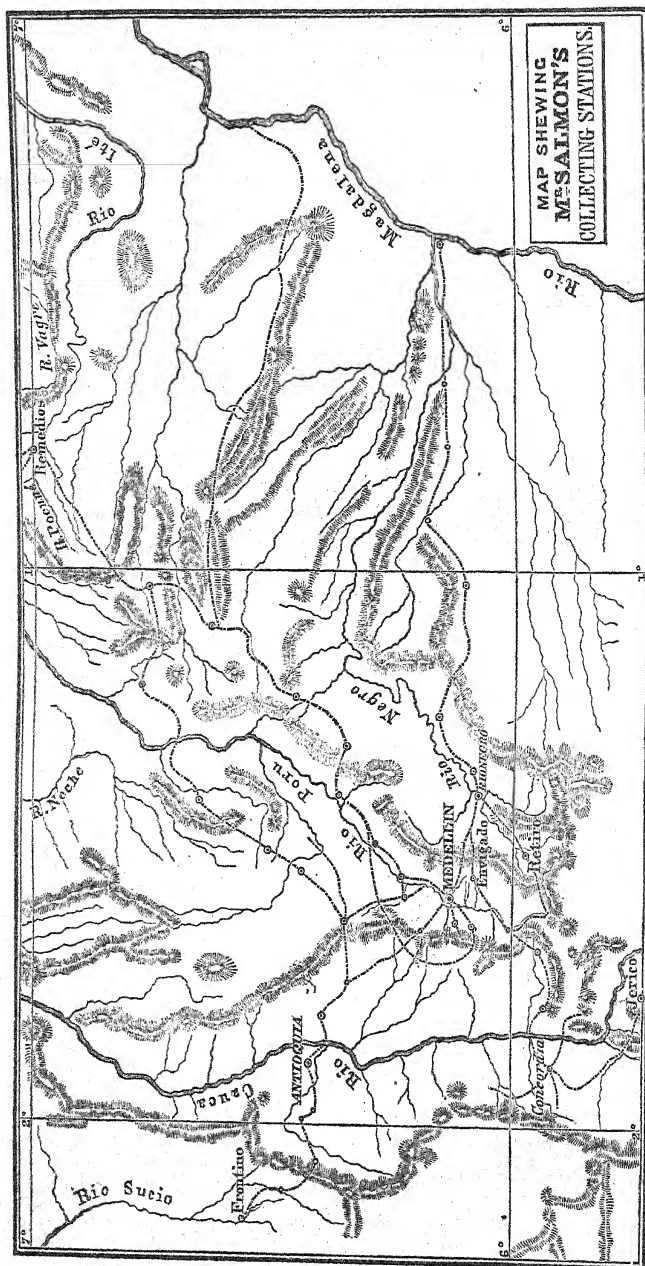
1. *Catharus phaeopleurus*, Scl. et Salv. P. Z. S. 1875, p. 541.
2. *Cyphorinus dichrous*, Scl. et Salv. *infra*, p. 492.
3. *Setophaga chrysops*, Salv. Ibis, 1878, p. 314.
4. *Chlorochrysa nitidissima*, Scl. P. Z. S. 1873, p. 728.
5. *Buarremon eleoprorus*, Scl. et Salv. *infra*, p. 504.
6. *Automolus holostictus*, Scl. et Salv. P. Z. S. 1875, p. 542.
7. — *ignobilis*, Scl. et Salv. *infra*, p. 522.
8. *Grallaria ruficeps*, Scl. P. Z. S. 1873, p. 729.
9. — *flavo-tincta*, Scl. Ibis, 1877, p. 445.
10. — *rufo-cinerea*, Scl. et Salv. *infra* p. 526.
11. *Chloronerpes dignus*, Scl. et Salv P. Z. S. 1877, p. 20.
12. *Brachygalba salmoni*, Scl. et Salv. *infra*, p. 535.
13. *Buteo hypospodius*, Gurney, Ibis, 1876, p. 73, pl. iii.
14. *Tigrisoma salmoni*, Scl. et Salv. P. Z. S. 1875, p. 38.

## II. ACCOUNT OF MR. SALMON'S LOCALITIES.

The exact localities where Mr. Salmon obtained his birds are mostly marked in the map which we now exhibit (see p. 488), copied from de Greiff's map of the province of Antioquia<sup>2</sup>. As will be seen, they lie mostly on affluents of the Magdalena and Cauca, though one is on the sources of the Sucio, which flows into the Atrato. The following gives such indications of them as we have been enabled to collect, partly from verbal communications with Mr. Salmon, partly from the map and other documents.

<sup>1</sup> See P. Z. S. 1873, p. 128, and 1875, p. 541.

<sup>2</sup> Mapa de la provincia de Antioquia en la republica de Nueva Granada, trazada de acuerdo con los mas modernos reconocimientos por C. S. de Greiff. Gravada por Alexis Orgiazzi, gravador del deposito de la guerra. Paris, 1857.



*Antioquia* lies on the left bank of the Cauca, some eight or ten miles off.

*Cauca*. The locality thus indicated is probably intended for the valley of the Cauca, which Mr. Salmon crossed on his routes to Antioquia, and on his expeditions to Concordia and Jerico.

*Concordia* is some 10 miles off the left bank of the Cauca, at an elevation of 6000 feet, and about 50 miles south-west of Medellin.

*Envigado* is near the sources of the Rio Poru, a confluent of the Cauca, and lies 12 miles south of Medellin, at an altitude of 5500 feet.

*Frontino* is on the upper waters of the Sucio, which flows into the Atrato, some 30 or 40 miles west of Antioquia city.

*Jerico* is on the left bank of the Cauca, south of Medellin. Here the splendid new Tanager *Chlorochrysa nitidissima* was obtained.

*Medellin*, the capital of the State of Antioquia, is situated on the Rio Poru, a branch of the Cauca. Its elevation is about 5000 feet.

*Pocune*. Rio Pocune is near Remedios, and is a small confluent of the Rio Vagre, which runs into the Neche and so into the Poru. Mr. Salmon's collecting-station here was at an altitude of about 1970 feet.

*Remedios* (elevation 2360 feet) is far to the north-east of Medellin, and is on the upper source of the Ité, a confluent of the Magdalena.

*Retiro* lies 25 miles south of Medellin, beyond Envigado, at an elevation of 8000 feet.

*Rio Neche* or *Nichi* is a confluent of the Rio Poru, which it enters at Dos Bocas. Mr. Salmon's collections were made a few miles above the confluence.

*Rio Negro* is a town on the river of the same name, which runs into the Magdalena. This town is some 25 miles east of Medellin.

*Sta. Elena* we have not been able to find marked in de Greiff's map. But we ascertain from Mosquera's 'Diccionario geográfico' that it is "a Quebrada" between 5° and 6° N. lat. It is therefore probably on the right bank of the Cauca, somewhere between Retiro and Jerico.

*San Miguel* is also not marked in the map. General Mosquera gives five places of this name in the State of Antioquia.

### III. SHORT SUMMARY OF PRECEDING AUTHORITIES ON THE BIRDS OF COLOMBIA.

Our knowledge of the ornithology of this part of South America is mainly due to the large collections of bird-skins made since 1840 by native collectors in the vicinity of Bogotá, the capital of the Confederation, and imported into Europe as merchandise. These skins are of very peculiar "make," and are well known to all ornithologists.

The circumstances under which these skins are collected, and a full list of the species contained in them as far as they were known

to the author, were given by Sclater in a paper read before the Society in 1855, and in two supplementary communications on the same subject<sup>1</sup>.

An account of the Trochilidæ of the vicinity of Bogotá, and of the localities in which they are obtained, has also been given by M. L. de Geoffroy, Secretary to the French Legation at Bogotá, in a paper published in Uricoechea's 'Contribuciones de Colombia a las Ciencias y a las Artes'<sup>2</sup>.

Since Sclater's papers were published, examples of many additional species have been received in "Bogotá" collections; and a complete list of "Bogotá" birdskins would embrace probably 700 species, instead of 510 given in Sclater's papers. Unfortunately, however, no record has ever been made of the exact localities whence these skins are obtained; and it seems certain that "Bogotá" collections embrace examples of species peculiar to the valleys on the east side of the Andean range (*i. e.* from the watershed of the Orinoco), as well as of species from the valleys on the west side and from the elevated districts surrounding Bogotá itself.

Besides "Bogotá skins" and their literature, we have, so far as we know, putting aside occasional notices of individual species, only three authorities on the birds of Colombia to refer to. These are:—

1. Mr. Cassin's Catalogue of the birds collected during the U.S. Survey of the Isthmus of Darien, published in 1861<sup>3</sup>. Mr. Cassin enumerated 144 species in this memoir, some of the rarities of which, as hereafter noticed, recur in the present collection from the neighbouring State of Antioquia.

2. Mr. Wyatt's articles on the birds obtained by him during his expedition to the Andes of Ocaña in 1870<sup>4</sup>. Mr. Wyatt enumerated 210 species as met with by him in this district, some of the more remarkable of which occur also in the present collection.

<sup>1</sup> On the Birds received in Collections from Santa Fé di Bogota. By Philip Lutley Sclater, M.A., P. Z. S. 1855, p. 131.

[This paper was afterwards separately printed and published, with an appendix containing a list of authorities added to it, under the following title:—

On Birds received in Collections from Santa Fé di Bogota. By Philip Lutley Sclater, M.A., Fellow of Corpus Christi College, Oxford, F.Z.S. &c. From the Proceedings of the Zoological Society, July 24, 1855. London. Printed for the Society. Sold at their House in Hanover Square, and by Messrs. Longman, Brown, Green and Longman, Paternoster Row.]

On some additional species of Birds received in Collections from Bogota. By Philip Lutley Sclater, M.A., P. Z. S. 1856, p. 25.

Further Additions to the List of Birds received in Collections from Bogota. By Philip Lutley Sclater, M.A., P. Z. S. 1857, p. 15.

<sup>2</sup> Note sur les Trochilidéés de la Nouvelle Grenade. Par M. L. Geoffroy, Contr. de Colombia, Bogota, 1861.

<sup>3</sup> "Catalogue of Birds collected during a Survey of a Route for a Canal across the Isthmus of Darien, by order of the Government of the United States, made by Lieut. N. Michler, of the U.S. Topographical Engineers, with Notes and Descriptions of new Species." By John Cassin. Proc. Acad. Nat. Sci. Philad. 1860, pp. 131 and 188.

<sup>4</sup> "Notes on some of the Birds of the United States of Colombia. By Claude W. Wyatt," Ibis, 1871, pp. 113, 319, and 373.

3. Messrs. Salvin and Godman's account of the birds collected by Mr. Simon during his exploration of the Sierra Nevada of Santa Marta, now in progress. This was commenced in 'The Ibis' for January last<sup>1</sup>, and will be continued in future numbers, as the work progresses.

#### IV. LIST OF SPECIES COLLECTED BY MR. SALMON.

##### PASSERES.

##### Fam. TURDIDÆ.

1. CATHARUS PHEOPLEURUS, ScL. et Salv. P. Z. S. 1875, p. 541.

Medellin. (Mus. P. L. S. and S.-G.)

"Food, insects. Builds in low bushes. Nest made of moss, grass, and fine roots."

Eggs (no. 28) pale bluish green, spotted with two or three shades of red-brown and lilac spots of various sizes, especially at the larger end: axis .95, diam. .72.

2. TURDUS SWAINSONI, Cab.

(Mus. S.-G.)

A single skin in the sixth collection, without precise locality.

3. TURDUS IGNOBILIS, ScL. P. Z. S. 1857, p. 273.

*Turdus leucomelas*, ScL. et Salv. Ex. Orn. p. 123 (partim).

Retiro, Cauca, Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris dark.

The eggs (no. 108) are palegreenishblue, thickly spotted, especially at the larger end, with several shades of red-brown; other eggs are nearly uniformly sprinkled with smaller and paler spots of red-brown: axis 1.16, diam. .84.

Under this name (founded originally upon Bogotá skins) we are now inclined to resuscitate a species lately united by us to *Turdus leucomelas*. The Colombian form is more uniformly dusky beneath, has less white on the throat, and its bill is always black.

4. TURDUS GIGAS, Fraser.

Retiro and Sta. Elena. (Mus. P. L. S. and S.-G.)

"Bill and feet orange; iris dark: food, worms and berries."

Eggs (no. 107) pale greenish-blue, spotted chiefly at the larger end with red-brown spots of several shades; some eggs are paler and the spots more uniform in size and more evenly distributed: axis 1.35, diam. .95.

5. TURDUS SERRANUS, Tsch.; ScL. et Salv. P. Z. S. 1870, p. 783.

Jerico, Frontino. (Mus. P. L. S. and S.-G.)

Iris dark; food, fruit.

<sup>1</sup> "On a Collection of Birds from the Sierra Nevada of Santa Marta, Colombia. By O. Salvin and F. D. Godman," *Ibis*, 1879, p. 196.

Eggs (no. 85) pale greenish-blue with blotches of pale red-brown, just as in some specimens of *Turdus merula*: axis 1.17, diam. .8.

6. *MIMUS GILVUS*, Vieill.

Medellin (Mus. S.-G.)

Iris dark.

Eggs (no. 59) pale greenish-blue, spotted chiefly at the larger end with large and small spots of several shades of red-brown: axis 1.05, diam. .8.

Fam. CINCLIDÆ.

7. *CINCLUS LEUCONOTUS*, Scl. P. Z. S. 1857, p. 274; Cat. A. B. pl. ii.; Salv. Ibis, 1867, p. 122.

Retiro and Frontino. (Mus. P. L. S. and S.-G.)

Iris dark.

Fam. SYLVIIDÆ.

8. *MYIADESTES RALLOIDES* (Lafr. et d'Orb.); Scl. et Salv. Ex. Orn. t. xxvii.

Retiro, Concordia, Medellin, Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris red-brown. Found in the deep forest.

Eggs (no. 11) pale reddish white, thickly spotted and freckled with red spots, chiefly at the larger end: axis .91, diam. .7.

Fam. TROGLODYTIDÆ.

9. *CINNICERTHIA UNIBRUNNEA* (Lafr.); Scl. Cat. A. B. p. 18.

Retiro, Sta. Elena. (Mus. P. L. S. and S.-G.)

Food, insects.

Mr. Salmon's specimens do not agree absolutely with examples of *C. unibrunnea* from Ecuador. They are all browner in colour, and the transverse markings of the wings and tail are much more clearly defined. In several specimens many of the feathers of the forehead are white; but as this character is of uncertain amount and absent in the majority of examples, it cannot be deemed a distinctive feature.

10. *CYPHORHINUS PHÆOCEPHALUS*, Scl. P. Z. S. 1861, p. 291.

Remedios. (Mus. S.-G.)

Iris dark; food, insects.

A species of Western Ecuador.

11. *CYPHORHINUS DICHROUS*, sp. n. (Plate XLI.)

*Obscure fumoso-brunneus in nigrum transeuns, gula, lateribus capitis et cervicis, pectore et ventro medio saturate castaneis; rostro nigro, pedibus corneis. Long tota 5, alæ 2.6, caudæ 1.5, tarsi 1.1: forma typica.*

*Hab.* Remedios, Antioquia (Salmon).

*Mus.* P. L. S.

A single specimen of this perfectly distinct species of *Cyphorhinus* was obtained at Remedios. Mr. Salmon notes "iris dark; food

insects." The simple coloration and absence of bars on the wings and tail readily distinguish this bird from its congeners.

12. *HENICORHINA LEUCOPHRYS* (Tsch.); Salvin, P. Z. S. 1870, p. 181.

Frontino. (Mus. S.-G.)

Food, insects.

Eggs (no. 64) either pure white or spotted with a few minute red spots: axis .84, diam. .6.

13. *THRYOPHILUS NIGRICAPILLUS* (Scl.).

*Thryothorus nigricapillus*, Scl. P. Z. S. 1860, p. 84.

Remedios, Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris dark. Food, insects.

A species of Western Ecuador.

"The nest is made of soft dry grass, and placed in a low bush."

—*T. K. S.*

14. *THRYOTHORUS MYSTACALIS*, Scl. P. Z. S. 1860, p. 64.

Sta. Elena. (Mus. P. L. S. and S.-G.)

15. *THRYOTHORUS FASCIATIVENTRIS* (Lafr.); Scl. et Salv. P. Z. S. 1864, p. 346.

Remedios, Neche. (Mus. S.-G.)

16. *TROGLODYTES SOLSTITIALIS*, Scl. P. Z. S. 1858, p. 550.

Sta. Elena, Neche. (Mus. S.-G.)

Food, insects.

Eggs (no. 72) white, spotted with small red spots, but not nearly so profusely as those of the next species, which resemble the eggs of *T. aëdon*: axis .69, diam. .55.

"This bird builds its nest in a hole in a wall or bank, or any convenient spot; it is made of soft blades of grass, and has a side entrance. The bird lays two eggs, white, thickly spotted with pale red."—*T. K. S.*

17. *TROGLODYTES TESSELLATUS* (Lafr. et d'Orb.); Salvin, P. Z. S. 1867, p. 135.

Medellin, Concordia. (Mus. P. L. S. and S.-G.)

Eggs (no. 39) white, thickly freckled with red as in *T. aëdon*: axis .77, diam. .57.

#### Fam. MNIOTILTIDÆ.

18. *SIURUS NOVEBORACENSIS* (Gm.).

Concordia, Medellin. (Mus. P. L. S. and S.-G.)

Iris dark. Food, insects.

19. *MNIOTILTA VARIA* (Linn.).

Concordia, Envigado, Sta. Elena. (Mus. S.-G.)

20. *PROTONOTARIA CITREA* (Bodd.).  
(Mus. S.-G.)
21. *HELMINTHOPHAGA CHRYSOPTERA* (Linn.).  
Sta. Elena. (Mus. S.-G.)
22. *HELMINTHOPHAGA PEREGRINA* (Wils.).  
Concordia. (Mus. P. L. S.)
23. *DENDRÆCA BLACKBURNIÆ* (Gm.).  
Concordia, Medellin, Sta. Elena, Remedios. (Mus. S.-G.)
24. *DENDRÆCA CASTANEA* (Wils.).  
Remedios. (Mus. P. L. S. and S.-G.)
25. *DENDRÆCA CÆRULEA* (Wils.).  
Medellin. (Mus. S.-G.)
26. *DENDRÆCA ÆSTIVA* (Gm.).  
Medellin. (Mus. S.-G.)
27. *GEOTHLYPIS PHILADELPHIA* (Wils.).  
Sta. Elena, Medellin. (Mus. P. L. S. and S.-G.)  
Iris dark. Food, insects.
28. *BASILEUTERUS CORONATUS* (Tsch.); Scl. P. Z. S. 1865,  
p. 284.  
Sta. Elena. (Mus. P. L. S. and S.-G.)  
Iris dark. Food, insects. Nest placed in a hole in a bank.  
Eggs (no. 35) white, distinctly spotted with red: axis '8, diam. '6.
29. *BASILEUTERUS SEMICERVINUS*, Scl. P. Z. S. 1860, p. 84,  
1865, p. 286, pl. x. fig. 1.  
Remedios, Neche. (Mus. P. L. S. and S.-G.)  
Iris dark.
30. *BASILEUTERUS NIGRICRISTATUS* (Lafr.).  
*Trichas nigri-cristata*, Lafr. R. Z. 1840, p. 230.  
Sta. Elena. (Mus. S.-G.)  
Food, insects.  
Eggs (no. 70) white, spotted with red, sometimes with large red blotches: axis '8, diam. '6.  
"The nest is placed in a hole in a bank, and built of dry grass-blades, and lined with the same. The nest itself is perfectly cup-shaped, and covered over the top with grass-blades. Those which I have seen contained only one egg, white, spotted rather thickly with small red spots."—*T. K. S.*
31. *SETOPHAGA RUTICILLA* (Linn.).  
Concordia, Medellin. (Mus. S.-G.)



32. *SETOPHAGA VERTICALIS*, d'Orb. et. Lafr.; Salvin, Ibis, 1878, p. 311.

Concordia, Sta. Elena. (Mus. P. L. S. and S.-G.)

Food, insects.

Eggs (no. 68) white, spotted with red, especially at the larger end: axis .72, diam. .78. Nest open, made of dead leaves and fibres, and lined with fine fibres.

33. *SETOPHAGA CHRYSOPS*, Salvin, Ibis, 1878, p. 314, pl. vii. fig. 2.

Retiro, Sta. Elena, Frontino. (Mus. P. L. S. and S.-G.)

Iris dark. Food, insects.

Eggs (no. 65) white, spotted with red, especially at the larger end: axis .7, diam. .55. Nest open, made of dead leaves, coarse grass, and fibres, lined with finer fibres.

This species is practically a new discovery of Mr. Salmon's; for although Delattre had previously obtained an example near Popayan, Kaup determined Delattre's specimen as *S. flaveola*. Mr. Salvin's description and figure were based upon Mr. Salmon's specimens.

#### Fam. VIREONIDÆ.

34. *VIREOSYLVA OLIVACEA* (Linn.).

Medellin, Remedios. (Mus. S.-G.)

35. *VIREOSYLVA JOSEPHÆ*, ScL.; Baird, Rev. A. B. p. 344.

Concordia, Medellin. (Mus. P. L. S. and S.-G.)

Iris dark. Food, insects.

36. *HYLOPHILUS SEMIBRUNNEUS*, Lafr. R. Z. 1845, p. 341.

Concordia. (Mus. P. L. S.)

37. *CYCLORHIS NIGRIROSTRIS*, Lafr. R. Z. 1842, p. 133.

Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris dark.

#### Fam. HIRUNDINIDÆ.

38. *PROGNE CHALYBEIA* (Gm.); ScL. P. Z. S. 1872, p. 606.

Remedios. (Mus. P. L. S.)

39. *ATTICORA CYANOLEUCA* (Vieill.); Baird, Rev. A. B. p. 309.

Frontino. (Mus. S.-G.)

Iris dark. Food, insects.

Eggs (no. 89) white: axis .77, diam. .5.

40. *ATTICORA TIBIALIS* (Cass.); Baird, Rev. A. B. p. 301.

Remedios. (Mus. S.-G.)

Iris dark.

"The nest is made of dry grasses, and placed in the hole of a bank."—T. K. S.

41. *STELGIDOPTERYX UROPYGIALIS* (Lawr.); Baird, Rev. A. B. v. 317.

Remedios. (Mus. S.-G.)

Iris dark. Food, insects.

Eggs (no. 100) white: axis  $\cdot 8$ , diam.  $\cdot 57$ .

Fam. CÆREBIDÆ.

42. *DIGLOSSA SITTOIDES* (d'Orb. & Lafr.); Scl. Ibis, 1875, p. 208.

Retiro, Concordia.

Iris dark. Food, insects.

43. *DIGLOSSA ALBILATERALIS*, Lafr.; Scl. Ibis, 1875, p. 216, pl. v. figs. 1 and 2.

Iris dark. Food, insects.

Retiro, Medellin, Sta. Elena. (Mus. P. L. S. and S.-G.)

Eggs (no. 56) greenish blue, thickly marked at the larger end with red-brown spots: axis  $\cdot 72$ , diam.  $\cdot 51$ . Nest open, made of moss, fibres, and rootlets, lined at the bottom with moss.

44. *DIGLOSSA BRUNNEIVENTRIS*, Lafr.; Scl. Ibis, 1875, p. 211.

Sta. Elena. (Mus. P. L. S. and S.-G.)

The occurrence of this *Diglossa* so far north is quite new to us; but we find no difference between Mr. Salmon's skins and Peruvian examples obtained by Jelski.

45. *DIGLOSSA PERSONATA* (Fraser); Scl. Ibis, 1875, p. 218.

Retiro, Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris red. Food, insects.

Eggs (see Plate XLII. fig. 1) pale greenish blue, thickly spotted with brown spots, especially at the larger end: axis  $\cdot 8$ , diam.  $\cdot 6$ . Nest open, made of dead grass, fibres, and a little moss, and lined with feathers.

46. *DIGLOSSOPIS CÆRULESCENS*, Scl.; Ibis, 1875, p. 219.

Sta. Elena. (Mus. S.-G.)

Iris red. Food, fruit and insects. Builds in low bushes.

Eggs (no. 13) pale greenish blue, blotched with red-brown spots, chiefly at the larger end: axis  $\cdot 75$ , diam.  $\cdot 57$ . Nest open, made of moss, fibres, and dead grass, and lined with fine fibres.

47. *CONIROSTRUM ALBIFRONS*, Lafr. R. Z. 1842, p. 301.

Sta. Elena. (Mus. S.-G.)

Iris dark. Food, insects.

48. *DACNIS CAYANA* (Linn.); Scl. Ibis, 1863, p. 313.

Remedios.

49. *DACNIS CÆREBICOLOR*, *Scl. Contr. Orn.* 1851, p. 106, et *Ibis*, 1863, p. 314.

Remedios. (Mus. P. L. S.)

Iris dark.

The single (male) example is not quite so bright in colour as the typical specimen from Bogotá in Sclater's collection.

50. *DACNIS EGREGIA*, *Scl. P. Z. S.* 1854, p. 251, et *Ibis*, 1863, p. 316.

Remedios, Neche. (Mus. S.-G.)

51. *DACNIS VENUSTA*, *Lawr.*; *Scl. Ibis*, 1863, p. 315.

Remedios. (Mus. S.-G.)

Iris dark. Food, fruit.

The extension of this species so far south is quite a new fact. Panama and Costa Rica are its previously known localities.

Besides these three species of *Dacnis*, Mr. Salmon sends a single skin from Remedios (Mus. P. L. S.), of what seems to be the female of an unknown member of this genus.

52. *CHLOROPHANES ATRICAPILLA* (Vieill.).

Concordia, Remedios. (Mus. S.-G.)

Iris dark. Food, fruit &c.

53. *CÆREBA CÆRULEA* (Linn.).

Remedios, Medellín. (Mus. S.-G.)

Iris dark. Food, insects.

54. *CERTHIOLA MEXICANA*, *Scl.*; *Finsch, Verh. z.-b. Ges. in Wien*, 1871, p. 772.

Remedios, Medellín. (Mus. S.-G.)

Iris dark. Food, insects.

Eggs (no. 50) dirty white, thickly spotted with red-brown, especially in a zone round the larger end: axis .65, diam. .5.

"The nest is made of fine dry grasses; it is oval-shaped, with a side entrance, and generally placed at the extremity of a bough, but not hanging."—*T. K. S.*

#### Fam. TANAGRIDÆ.

55. *PROCNIAS TERSA* (Linn.).

*Procnias occidentalis*, *Scl. P. Z. S.* 1854, p. 249, et nobis (*passim*).

Remedios. (Mus. S.-G.)

Iris dark. Food, fruit and insects.

After comparing a number of specimens of *Procnias* from different localities, we have come to the conclusion that the grounds for keeping separate the western form are untenable. Salvin has already adopted this view (*Ibis*, 1879, p. 199).

56. *CHLOROPHONIA PRETRII* (Lafr.); Scl. Cat. A. B. p. 55.

Sta. Elena. (Mus. S.-G.)

Iris dark. Food, fruit.

57. *EUPHONIA NIGRICOLLIS* (Vieill.); Scl. Cat. A. B. p. 56.

Medellin. (Mus. S.-G.)

Iris dark. Food, fruit.

58. *EUPHONIA MINUTA* (Cab.); Scl. Cat. A. B. p. 57.

Remedios. (Mus. S.-G.)

Iris dark.

59. *EUPHONIA TRINITATIS*, Strickl. Contr. Orn. 1851, p. 72.

Remedios. (Mus. P. L. S.)

We must refer Mr. Salmon's single skin to this species. It is rather larger and of a deeper violet on the back than typical specimens from "Trinidad" collections, and in the latter respect agrees with a specimen from Sta. Marta in Sclater's collection.

60. *EUPHONIA XANTHOGASTRA*, Sund.; Scl. P. Z. S. 1856, p. 275.

Concordia. (Mus. S.-G.)

61. *EUPHONIA FULVICRIS*, Scl. P. Z. S. 1856, p. 276.

Remedios, Neche. (Mus. S.-G.)

Iris dark.

62. *CHLOROCHRYSA NITIDISSIMA*, Scl. P. Z. S. 1873, p. 728, et Ibis, 1875, p. 466, pl. x.

This is one of the finest of Mr. Salmon's discoveries. Besides the original specimen (in Sclater's collection), Mr. Salmon has recently sent home another example from Jerico (Mus. S.-G.).

Mr. Ridgway writes that examples of this species have lately been received in the U. S. from Colombia, and are in his own and Mr. Lawrence's collection.

63. *DIVA VASSORI* (Boiss.); Scl. P. Z. S. 1856, p. 264.

Sta. Elena. (Mus. S.-G.)

64. *CALLISTE AURULENTA* (Lafr.); Scl. Mon. Call. p. 29, pl. xiv. fig. 2.

Concordia, Frontino. (Mus. P. L. S. and S.-G.)

Iris dark.

65. *CALLISTE ICTEROCEPHALA* (Bp.); Scl. l. c. pl. xvii.

Frontino. (Mus. S.-G.)

Iris dark.

66. *CALLISTE VITRIOLINA* (Cab.); Scl. l. c. pl. xviii.

Medellin, Concordia. (Mus. S.-G.)

Food, fruit.

Eggs (no. 26) pale greenish, thickly spotted and blotched with

lilac-brown marks, especially in a zone round the larger end: axis .89, diam. .61. (See Plate XLII. fig. 2.) Nest open, made outwardly of moss, and lined with fine roots, fibres, and horsehair.

67. *CALLISTE GYROLOIDES* (Lafr.); *Scl. l. c.* pl. xxvi.

Concordia, Remedios. (Mus. P. L. S. and S.-G.)

Iris dark. Food, fruit.

68. *CALLISTE RUFICERVIX* (Prév.); *Scl. l. c.* pl. xxxii.

Concordia. (Mus. S.-G.)

69. *CALLISTE ATRICAPILLA* (Lafr.); *Scl. l. c.* pl. xxxiii.

Retiro, Concordia, Frontino. (Mus. P. L. S. and S.-G.)

Iris dark. Food, fruit.

Eggs (no. 77) pale greenish, thickly spotted with dark red-brown spots, especially at the larger end: axis .75, diam. .61.

70. *CALLISTE NIGRIVIRIDIS* (Lafr.); *Scl. l. c.* p. 76.

*C. cyanescens*, *Scl. l. c.* p. 79, pl. xxxv.

Sta. Elena, Envigado. (Mus. P. L. S. and S.-G.)

Iris dark. Food, insects.

Eggs (no. 91) pale greenish, thickly spotted and blotched with lilac-brown marks, especially in a zone round the larger end: axis .82, diam. .58.

71. *CALLISTE INORNATA*, Gould, P. Z. S. 1855, p. 158; *Scl. l. c.* pl. xlv.

Nichi. (Mus. P. L. S. and S.-G.)

Iris dark.

72. *CALLISTE LARVATA*, Du Bus; *Scl. l. c.* pl. xxxvi.

Remedios. (Mus. S.-G.)

Iris dark. Food, fruit.

The extension of this Central-American species so far south is new to us, and noteworthy. Its previously recorded range was from Tabasco to Panama.

73. *CALLISTE CYANEICOLLIS* (Lafr. et d'Orb.); *Scl. l. c.* pl. xxxviii.

Concordia, Frontino. (Mus. P. L. S. and S.-G.)

Iris dark. Food, fruit.

74. *CALLISTE LABRADORIDES* (Boiss.); *Scl. l. c.* pl. xxxix.

Concordia, Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris dark. Food, fruit.

75. *CALLISTE VENUSTA*, *Scl. l. c.* pl. xlv. fig. 2.

Frontino. (Mus. P. L. S. and S.-G.)

Iris dark. Food, fruit.

76. *IRIDORNIS DUBUSIA*, Bp.; *Scl. P. Z. S.* 1856, p. 244.

Sta. Elena. (Mus. S.-G.)

Iris dark. Food, fruit.

77. *IRIDORNIS PORPHYROCEPHALA*, *Scl. P. Z. S.* 1856, p. 243.

Medellin. (Mus. P. L. S. and S.-G.)

Iris dark. Food, fruit.

78. *PÆCILOTHRAUPIS PALPEBROSA* (Lafr.).

*Tanagra palpebrosa*, Lafr. *R. Z.* 1847, p. 71.

Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris dark.

Mr. Salmon's skins belong to the true *P. palpebrosa* of Colombia and Ecuador, and agree with Bogotá specimens. *P. lacrymosa* of Peru is distinct. (*Cf. Cab. Journ. f. Orn.* 1873, p. 317.)

79. *BUTERAUPIS CUCULLATA* (Jard.); *Scl. P. Z. S.* 1856, p. 239.

Concordia. (Mus. S.-G.)

80. *COMPSOCOMA SUMPTUOSA* (Less.); *Scl. P. Z. S.* 1856, p. 238.

Retiro, Medellin, Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris dark.

We are of opinion that *C. cyanoptera*, Cab. (*Journ. f. Orn.* 1866, p. 235), can hardly be maintained as distinct. One of Mr. Salmon's skins comes very near this form, having the edgings of the primaries almost as blue as the wing-coverts; others rather resemble the true *C. sumptuosa*. We likewise refer skins from Venezuela (*Görling*) to this species.

81. *DUBUSIA TENIATA* (Boiss.); *Scl. P. Z. S.* 1856, p. 237.

Sta. Elena. (Mus. S.-G.)

We question the distinctness of *D. selysia*, Bp., of Ecuador.

82. *TANAGRA CANA*, Sw.

Medellin. (Mus. S.-G.)

Iris dark. Food, fruit. Builds in orange-trees.

Eggs (no. 22) rich brown, densely blotched with darker spots, especially at the larger end: axis .92, diam. .68.

83. *TANAGRA PALMARUM* (Max.).

Remedios. (Mus. S.-G.)

Iris dark. Food, fruit.

Eggs (no. 92) pale whitish, very thickly freckled with red-brown spots: axis .95, diam. .65.

"The nest is placed in the fork of a shrub or low tree, and formed of grass-stalks mixed with roots and fibres, lined, and ornamented on the outside, with green moss. I have never seen more than one egg, although I have examined many nests."—*T. K. S.*

84. *TANAGRA CYANOCEPHALA* (d'Orb. et Lafr.)

*Tanagra maximiliani*, d'Orb. Voy. p. 276, pl. xxiii. fig. 2.

Retiro, Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris dark. Food, fruit. Builds in high trees.

Eggs (no. 24) pale whitish, thickly blotched with spots of various sizes of red-brown: axis 1.04, diam. .71.

To this species should be united *Tanagra auricrissa*, ScL., of Bogotá, and *T. subcinerea*, ScL. (P. Z. S. 1861, p. 129), of Venezuela, as has been already done, Nomencl. p. 21. After comparing a large series, we find no sufficient grounds of separation.

85. *RHAMPHOCÆLUS DIMIDIATUS* (Lafr.); ScL. P. Z. S. 1856, p. 129.

Antioquia, Remedios, Neche. (Mus. S.-G.)

Iris dark red. Food, fruit.

Eggs (no. 94) pale greenish blue, spotted and streaked with large spots and fine lines of dark brown: axis .91, diam. .65.

"The nest is placed in low bushes, and is composed of small twigs, dead leaves, moss, and lichens."—*T. K. S.*

86. *RHAMPHOCÆLUS FLAMMIGERUS* (Jard. et Selb.); ScL. P. Z. S. 1856, p. 131.

Medellin. (Mus. P. L. S. and S.-G.)

Iris dark. Food, fruit. Builds in orange-trees and bushes.

Eggs (no. 20) pale greenish blue, sparsely spotted with large dark-brown spots and blotches: axis 1.05, diam. .75. (See Plate XLII. fig. 3.)

87. *RHAMPHOCÆLUS CHRYSNOTUS*, Lafr.; ScL. P. Z. S. 1856, p. 131.

This species was omitted from the "Nomenclator," but seems distinguishable from *R. icteronotus* and *R. flammigerus*, as already pointed out. Mr. Salmon's specimens (in his 8th collection) have no exact locality attached to them.

88. *RHAMPHOCÆLUS ICTERONOTUS*, Bp.; ScL. P. Z. S. 1856, p. 131.

Remedios, Neche. (Mus. S.-G.)

Iris dark red. Food, fruit.

Eggs (no. 93) similar to those of *R. flammigerus*, but smaller: axis 1.0, diam. .72.

"The nest is made of small twigs, moss, and dead leaves, lined with fibrous roots, and is placed in low bushes, orange-trees, &c. It varies very much in appearance, some being plain clumsy structures, whilst others are prettily ornamented with leaves and lichens."—*T. K. S.*

89. *PYRANGA RUBRA* (Linn.).

Remedios. (Mus. S.-G.)

Food, fruit.

90. *PYRANGA ÆSTIVA* (Gm.)

Concordia, Frontino. (Mus. S.-G.)

Iris dark.

91. *PYRANGA TESTACEA*, Sci. et Salv. P. Z. S. 1868, p. 388.

Concordia, Medellin. (Mus. S.-G. and P. L. S.)

Mr. Salmon's skins appear to be referable to this Central-American form rather than to the Brazilian *P. saira*.

92. *PYRANGA RUBRICEPS*, Gray; Sci. P. Z. S. 1856, p. 125.

Medellin, Sta. Elena. (Mus. S.-G. and P. L. S.)

Iris dark.

In the female of this species, of which Mr. Salmon has sent a single specimen (Mus. P. L. S.), the scarlet colour is confined to the summit of the head and the throat, instead of pervading the upper back and breast as in the male.

93. *ORTHO GONY S OLIVACEUS*, Cassin, Pr. Ac. Sc. Phil. 1860, p. 140, et *ibid.* 1864, pl. ii.

Remedios, Neche. (Mus. S.-G. and P. L. S.)

Iris dark. Food, fruit.

Mr. Salmon has sent home two skins of this remarkable bird, which upon the whole has, we think, been correctly assigned by Mr. Cassin to *Orthogonys*, though not quite typical in form. It has proportionally shorter wings and tail. Mr. Cassin's specimens were obtained during the Atrato Expedition on the river Truando. With this exception no other examples, so far as we are aware, are known.

94. *PHÆNICOTHTRAUPIS GUTTURALIS*, Sci. Ann. Nat. Hist. xiii. p. 95 (1854); Wyatt, Ibis, 1871, p. 326.

Remedios. (Mus. P. L. S. and S.-G.)

Iris dark. Food, fruit.

Eggs (no. 96) pale greyish white, mottled, especially at the larger end, with red-brown and lilac spots: axis 1.1, diam. .71. (See Plate XLII. fig. 4.)

"The nest is cup-shaped, rather deep, and loosely made of coarse roots and fibres, lined with fine stalks &c. of ferns, and placed in low bushes by the side of mountain-streams."—*T. K. S.*

95. *PHÆNICOTHTRAUPIS CRISTATA*, Lawrence, Ann. Lyc. N. H. New York, xi. p. 70 (1875).

Frontino. (Mus. P. L. S. and S.-G.)

Iris dark.

Two examples of this species, which, though like *P. rubica* and its allies in coloration, differs, as Mr. Lawrence remarks, in its well-developed crest.



96. *EUCOMETIS CASSINI* (Lawr.).

*Tachyphonus cassini*, Lawr. Ann. L. N. Y. vii. p. 297.

*Eucometis cassini*, ScL. et Salv. P. Z. S. 1864, p. 351, pl. xxx.;  
Salvin, P. Z. S. 1867, p. 139.

Nече. (Mus. S.-G.)

Iris dark. Food, fruit &c.

Mr. Salmon's skins agree with Central-American examples of this species, which had not been previously received from any place south of Panama.

97. *CREURGOPS VERTICALIS*, ScL. P. Z. S. 1858, p. 72, pl. cxxii.

Sta. Elena. (Mus. P. L. S. and S.-G.)

Mr. Salmon sends examples of both sexes of this little-known Tanager, originally described from a Rio-Napo skin. The female, hitherto undescribed, is rather smaller than the male, and has the vertical spot only faintly indicated.

98. *TACHYPHONUS MELALEUCUS* (Spartm.); ScL. P. Z. S. 1856, p. 113.

Medellin, Remedios. (Mus. S.-G.)

Iris dark. Food, fruit. Builds in high grass.

Eggs (no. 19) pale salmon-colour with a few large isolated dark-brown spots: axis 1.0, diam. .71. (See Plate XLII. fig. 5.)

99. *TACHYPHONUS LUCTUOSUS* (Lafr. et d'Orb.); ScL. P. Z. S. 1856, p. 114.

Remedios, Nече. (Mus. S.-G.)

Iris dark. Food, fruit &c.

100. *TACHYPHONUS XANTHOPYGIUS*, ScL. P. Z. S. 1856, p. 116.

Remedios. (Mus. S.-G. and P. L. S.)

Iris dark.

Originally described from Bogotá skins, but extends north to Panama (P. Z. S. 1864, p. 351).

101. *TACHYPHONUS DELATRII* (Lafr.); ScL. et Salv. Ex. Orn. p. 67, pl. xxxiv.

Remedios, Nече. (Mus. S.-G. and P. L. S.)

Iris dark. Food, fruit.

102. *NEMOSIA ALBIGULARIS*, ScL. P. Z. S. 1855, p. 109, pl. xcix.

Remedios. (Mus. S.-G.)

Iris dark.

Agrees with Bogotá skins.

103. *CHLOROSPINGUS FLAVIPECTUS* (Lafr.); ScL. P. Z. S. 1856, p. 90.

Retiro, Concordia, Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris white. Food, fruit &c.

Eggs (no. 53) white, spotted with pale red spots: axis .82, diam. .63. (See Plate XLII. fig. 6.)

104. *CHLOROSPINGUS ATRIPILEUS* (Lafr.); Scl. P. Z. S. 1856, p. 91.

Medellin, Sta. Elena. (Mus. S.-G.)

105. *CHLOROSPINGUS RUBRIROSTRIS* (Lafr.); Scl. P. Z. S. 1856, p. 92.

Sta. Elena. (Mus. S.-G.)

Eggs (no. 15) pale greenish white, spotted thickly at the larger end with reddish lilac: axis 91, diam. .63.

106. *CHLOROSPINGUS IGNOBILIS* (Scl.): Scl. et Salv. P. Z. S. 1870, p. 784.

Sta. Elena. (Mus. S.-G.)

107. *CHLOROSPINGUS VERTICALIS* (Lafr.); Scl. P. Z. S. 1856, p. 93.

A single skin in Mr. Salmon's sixth collection without exact locality. (Mus. S.-G.)

108. *BUARREMON ASSIMILIS* (Boiss.); Scl. P. Z. S. 1856, p. 85. Medellin, Sta. Elena. (Mus. S.-G.)

109. *BUARREMON BRUNNEINUCHUS* (Lafr.); Scl. P. Z. S. 1856, p. 85.

Concordia, Medellin, Sta. Elena. (Mus. S.-G.)

Eggs (no. 34) nearly white, faintly tinged with very pale greenish blue: axis 1.4, diam. 7.6.

110. *BUARREMON GUTTURALIS* (Lafr.).

*B. chrysopogon* et *B. gutturalis*, Scl. P. Z. S. 1856, p. 86.

*B. gutturalis*, Salv. Ibis, 1874, p. 122.

Medellin, Remedios. (Mus. S.-G.)

Eggs (no. 21) very pale greenish blue: axis 1.0, diam. .7.

111. *BUARREMON ELÆOPRORUS*, sp. nov.

*Supra* obscure olivaceus, *subnigricans*; *pileo* rufo-castaneo; *capitis lateribus* nigris; *lororum macula parva flava*; *alis caudaque* nigris; *speculo alari albo*; *subtus læte flavus*; *lateribus et crisso in olivaceum transeuntibus*; *rostro corneo, pedibus corylinis*. *Long. tota* 7.0, *alæ* 2.8, *caudæ* 3.0.

*Hab.* Medellin et Sta. Elena in Statu Antioquiæ reipubl. Colombianæ.

*Mus.* S.-G. et P. L. S.

*Obs.* Aff. *B. latinuchæ* ex Peruvia, sed maculæ lororum flavæ et colore dorsi olivaceo nec nigro distinguendus.

Iris dark; fruit in stomach.

Eggs (no. 36) reddish white, spotted and blotched with red and pale reddish lilac: axis .95, diam. .7. (See Plate XLII. fig. 7.)

112. BUARREMON CASTANEICEPS, ScL. P. Z. S. 1859, p. 441, et 1860, p. 86.

Frontino. (Mus. S.-G.)

Eggs (no. 79) white, thickly spotted at the larger end with red : axis 1.4, diam. .75.

113. ARREMON SPECTABILIS, ScL. P. Z. S. 1854, p. 114, pl. lxvii.

*A. spectabilis* et *A. erythrorhynchus*, ScL. P. Z. S. 1856, pp. 82, 83, et Cat. A. B. p. 93.

Remedios. (Mus. P. L. S. and S.-G.)

This species extends from Eastern Peru through Ecuador into Colombia. *A. erythrorhynchus*, founded on Bogotá skins, is, we believe, identical.

114. PSITTOSPIZA RIEFFERI (Boiss.) ; ScL. P. Z. S. 1856, p. 78.

Envigado, Concordia, Medellin, Remedios, Sta. Elena. (Mus. P. L. S. and S.-G.)

Eggs (no. 61) pale grey, thickly freckled with lilac-grey spots : axis 1.2, diam. .82. (See Plate XLII. fig. 8.)

"This bird builds a nest of considerable size, made of green moss, lined thickly within, and on the outside prettily ornamented with long tapering green ferns. I have seen but one egg in a nest, but cannot speak positively as to the number generally laid."—T. K. S.

115. SALTATOR MAGNUS (Gm.) ; ScL. P. Z. S. 1856, p. 70.

Remedios, Medellin, Neche. (Mus. S.-G.)

Iris dark.

Eggs (no. 97) pale greenish blue, with a zone of black spots and hair-lines round the larger end : axis 1.13, diam. .78.

"The nest is composed of small sticks and fern-stalks, and placed in low underwood."—T. K. S.

116. SALTATOR ATRIPENNIS, ScL. Cat. A. B. p. 95.

Medellin. (Mus. P. L. S. and S.-G.)

Iris dark. Stomach contained fruit.

117. SALTATOR ALBICOLLIS, Vieill. ; ScL. P. Z. S. 1856, p. 73.

Medellin, Remedios, Sta. Elena. (Mus. S.-G.)

Eggs (no. 25) pale greenish blue, with a zone of fine black lines round the larger end : axis 1.0, diam. .7. (See Plate XLII. fig. 9.)

118. ORCHESTICUS ATER (Gm.) ; ScL. P. Z. S. 1856, p. 67.

A skin in the eighth collection without exact locality. (Mus. S.-G.)

119. PITYLUS GROSSUS (Linn.) ; ScL. P. Z. S. 1856, p. 64.

Remedios, Neche. (Mus. S.-G.)

## Fam. FRINGILLIDÆ.

## 120. HEDYMELES LUDOVICIANUS (Linn).

Several examples without exact localities. This northern species also occurs in Bogotá collections. (Mus. S.-G.)

## 121. GUIRACA CYANOIDES (Lafr.); Scl. et Salv. P. Z. S. 1864, p. 352.

Remedios. (Mus. S.-G.)

## 122. ORYZOBORUS OCCIDENTALIS, Scl. P. Z. S. 1860, p. 276.

Medellin. (Mus. S.-G.)

Iris dark. Seeds in stomach.

To this form of *O. crassirostris* Bogotá skins must also be referred.

Eggs (no. 12) greyish brown, indistinctly blotched with lilac-grey, and strongly marked with dark red-brown marks: axis .93, diam. .6.

"Not a common bird here. I have seen but one nest, which was built in a low bush in a wild swampy place. It was constructed of the stems of coarse grass, lined with a finer kind, and contained two eggs mottled over with light brown with a few irregular blots and dashes of a darker colour. The female was sitting, and the male perched on a bush at a short distance."—*T. K. S.*

## 123. ORYZOBORUS FUNEREUS, Scl.

*Oryzoborus funereus*, Scl. P. Z. S. 1859, p. 278, et *O. æthiops*, Scl. P. Z. S. 1860, p. 88.

Medellin. (Mus. S.-G.)

Iris dark. Food, seeds.

Eggs (no. 5) greenish white, thickly marked with brown spots, especially at the larger end: axis .73, diam. .55.

In our 'Nomenclator' we have united these two species of Sclater's, of which the former was founded on Mexican, the latter on Ecuadorian skins. The points of difference given when the latter was described do not hold when a series is compared; and the species must be regarded as extending from Southern Mexico through Central America into Colombia and Ecuador.

"A not uncommon bird in wild uncultivated places, where it makes its nest in low bushes, very slight in structure, of dry grass, and lays two eggs, mottled over with brown of different shades, and a few spots of a darker colour."—*T. K. S.*

## 124. SPERMOPHILA MINUTA (Linn.); Scl. Ibis, 1871, p. 3.

Retiro, Medellin. (Mus. S.-G.)

Iris dark. Food, seeds.

Eggs (no. 9) white, clearly marked with several shades of rich red-brown spots: axis .65, diam. .51.

"Builds in low bushes much the same sort of nest as *S. gutturalis*, but of coarser grass."—*T. K. S.*

125. *SPERMOPHILA LUCTUOSA*, Lafr.; *Scl. Ibis*, 1871, p. 15.  
Medellin. (Mus. S.-G.)
126. *SPERMOPHILA GUTTURALIS* (Licht.); *Scl. Ibis*, 1871, p. 15.  
Medellin, Envigado. (Mus. S.-G.)  
Iris dark. Stomach contained seeds. Nests in low bushes.  
Eggs (no. 8) pale greenish white, marked with large blotches of several shades of rich brown: axis .7, diam. .5.  
"The nest is built at a height of four or five feet, of stems of dry grass rather loosely put together, in which two eggs are laid."—*T. K. S.*
127. *SPERMOPHILA GRISEA* (Gm.); *Scl. Ibis*, 1871, p. 18.  
Envigado, Medellin. (Mus. P. L. S. and S.-G.)
128. *CATAMBLYRHYNCHUS DIADEMA*, Lafr. *Rev. Zool.* 1842, p. 301.  
Sta. Elena. (Mus. S.-G.)
129. *VOLATINIA JACARINA* (Linn.); *Scl. Cat. A. B.* p. 106.  
Medellin. (Mus. S.-G.)  
Iris dark; stomach contained seeds; nests on the ground.  
Eggs (no. 7) white, spotted with red, chiefly in a zone round the larger end: axis .7, diam. .55.  
"This nest is carefully concealed very close to or upon the ground amongst grass or herbage in waste places. It is slightly constructed of dry grass stems, lined with hair, or sometimes with the stems of a small flowering plant.  
"The eggs are two in number, pale bluish white, spotted with red brown."—*T. K. S.*
130. *PHONIPARA FUSILLA*, Sw.; *Scl. Cat. A. B.* p. 106.  
Retiro, Sta. Elena, Medellin. (Mus. S.-G.)  
Iris dark.  
Eggs (no. 41) white, marked, especially at the larger end, with brown spots: axis .68, diam. .51.
131. *ZONOTRICHIA PILEATA* (Bodd.); *Scl. Cat. A. B.* p. 113.  
Retiro, Envigado, Medellin. (Mus. S.-G.)  
Iris dark. Nests in low bushes.  
Eggs (no. 14) pale bluish green, thickly freckled with red spots: axis .85, diam. .65.
132. *EMBERIZOIDES MACRURUS* (Gm.); *Scl. Cat. A. B.* p. 118.  
Antioquia, Medellin. (Mus. S.-G.)  
Iris dark; stomach contained insects; nests in high grass.  
Eggs (no. 23) white, sparingly spotted and streaked with black, chiefly at the larger end: axis .95, diam. .69.

133. *EUSPIZA AMERICANA* (Gm.)

No exact locality given. (Mus. S.-G.)

This northern species also occurs in Bogotá collections.

134. *CHRYSOMITRIS COLUMBIANA* (Lafr.); Scl. Cat. A. B. p. 124.

Concordia, Retiro, Sta. Elena, Medellín. (Mus. S.-G.)

Eggs (no. 4) pale greenish white: axis .65, diam. .45.

"This species builds a pretty nest, often artfully placed on the branch of a fruit-tree. It is composed externally of dried grass intermixed with moss, cotton, and lichen; sometimes the cotton abounds: it is very carefully finished and delicately lined with hair. The eggs are three in number, white, slightly tinged with blue, without any spots. It breeds in June and July, and is a very common bird. The young first assume the plumage of the female; and after the breeding-season they are generally seen in flocks of ten or twelve."—*T. K. S.*

135. *CHRYSOMITRIS XANTHOGASTRA*, Du Bus; Scl. et Salv. P. Z. S. 1870, p. 785.

Sta. Elena. (Mus. S.-G.)

This Siskin is widely distributed, extending from Costa Rica into Bolivia. It occurs in Bogotá collections.

Eggs (no. 10) pale greenish white, thickly but faintly freckled with lilac and brownish spots: axis .7, diam. .5.

Fam. *ICTERIDÆ*.136. *OCYALUS WAGLERI* (Gray & Mitch.); Scl. Cat. A. B. p. 127.

Pocune, Remedios. (Mus. S.-G.)

Iris blue.

Eggs (no. 150) pale greenish white, blotched with sepia spots of various sizes: axis 1.3, diam. .88. (Plate XLIII. fig. 3.)

137. *OSTINOPS DECUMANUS* (Pall.); Salvin, Ibis, 1879, p. 200.

Remedios. (Mus. S.-G.)

Iris blue.

Eggs (no. 149) pale greenish blue, sparsely spotted with dark-brown spots: axis 1.3, diam. 1.

138. *OSTINOPS GUATEMOZINUS*, Bp. Compt. Rend. xxxviii. p. 833, et Notes s. l. Coll. Delattre, p. 10 (1853); Cassin, Pr. Acad. Phil. 1860, p. 138; Scl. et Salv. Nomencl. p. 35.

Remedios. (Mus. P. L. S. and S.-G.)

Iris blue.

Eggs (no. 148) pale pinkish white, sparsely spotted with large red-brown spots: axis 1.3, diam. 1.

These are the first specimens we have ever seen of this fine species, except the type in the Paris Museum and the specimen in Washing-

ton. It is of the size and structure of *O. montezumæ*, from which, and from *O. bifasciatus* Mr. Cassin has accurately pointed out its differences in a footnote (*op. cit.* p. 138).

The Paris specimen is from the Magdalena valley (*Fontanier*), that of Cassin from the river Truando (*Wood*).

139. *OSTINOPS ATROCASTANEUS*, Cab. Journ. f. O. 1873, p. 309.

Envigado, Concordia, Frontino. (Mus. P. L. S. and S.-G.)

Iris red.

Eggs (no. 113) reddish salmon-colour, blotched and spotted with large burnt-sienna spots chiefly at the larger end. In some specimens the spots are smaller and darker; in others the ground-colour is much darker and the spots paler and more diffused: axis 1.46, diam. 1.05. (See Plate XLIII. figs. 1, 2.)

Dr. Cabanis has, we think, fairly distinguished this form from the allied *O. atrovirens*. Specimens from Ecuador (*O. atrovirens*, *Scl. P. Z. S.* 1859, p. 140, et 1860, p. 88, nec d'Orb.) are apparently similar; but the Bogotá bird (*O. sincipitalis*, *Cab. l. c.*) is not quite so darkly coloured, although nearer the present form than to the southern *O. atrovirens*.

140. *CASSICUS FLAVICRISTUS*, *Scl. P. Z. S.* 1860, p. 276.

Remedios. (Mus. S.-G.)

Iris blue.

Eggs (no. 151) white, sparingly spotted with dark brown, chiefly at the larger end: axis 1.2, diam. .8.

141. *CASSICUS UROPYGIALIS*, *Lafr. R. Z.* 1843, p. 290.

Jerico. (Mus. S.-G.)

142. *CASSICUS LEUCORHAMPHUS* (Bp.); *Scl. Cat. A. B.* p. 129.

Envigado, Concordia, Sta. Elena. (Mus. S.-G.)

Iris dark.

143. *ICTERUS GIRAUDI*, Cassin; *Scl. Cat. A. B.* p. 133.

Envigado, Concordia, Medellin. (Mus. S.-G.)

Insects and fruit in stomach.

Eggs (no. 66) pale grey, blotched and streaked with dark brown and grey: axis 1.15, diam. .72.

144. *ICTERUS MESOMELAS*, *Wagl.*; *Scl. Cat. A. B.* p. 133.

Neche.

145. *DOLICHONYX ORYZIVORUS* (Linn.)

Medellin.

146. *MOLOTHRUS DISCOLOR* (Vieill.); Cassin, *Pr. Acad. Sc. Phil.* 1866, p. 20; *Scl. et Salv. Nomencl.* p. 37.

Concordia, Medellin, Sta. Elena. (Mus. P. L. S. and S.-G.)

Eggs (no. 46) pinkish white, thickly freckled with red, especially at the larger end: axis 1, diam. .8.

We refer Mr. Salmon's skins to the large form of *M. bonariensis* thus determined by Cassin. *M. atronitens*, Cab., of Guiana, is not the same, as supposed by Cassin, but a smaller species, of the same size as *M. bonariensis*.

147. *HYPOPYRRHUS PYRRHOGASTER* (De Tarr.); Bp. Consp. p. 425.

Envigado, Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris white.

Eggs (no. 121) pale greenish grey, spotted and streaked with lilac and dark brown: axis 1·22, diam. ·82. (See Plate XLIII. fig. 4.)

"A restless bird, seldom seen alone, but in small parties of six or eight. In the breeding-season, however, its habits are solitary. The nest is composed of large dead leaves and sticks, and is placed loosely in the fork of a small tree."—*T. K. S.*

148. *CASSIDIX ORYZIVORA* (Linn.); Scl. Cat. A. B. p. 142.

Concordia, Antioquia, Remedios.

Iris white.

Eggs (no. 152) white: axis 1·45 and 1·15, diam. ·93 and ·86.

There is a remarkable difference in the size of the two eggs sent of this species.

149. *CYANOCORAX INCAS* (Bodd.)

*Xanthura yncas*, Sharpe, Cat. B. iii. p. 129.

*Xanthura incas*, Scl. Ibis, 1879, p. 87.

Retiro, Concordia, Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris yellow.

Mr. Salmon's skins have the head quite white, and belong to the typical form from Ecuador and Peru.

Eggs (no. 120) greenish grey, thickly mottled with darker shades of the same colour: axis 1·15, diam. ·85.

"Has much the habits of the English Jay, being ever on the move and seldom silent, except when near its nest or when at mischief. It robs the Indian corn-fields before the grain is ripe, but at other times subsists on grubs and insects. The nest is made of sticks and roots, and is placed in a high bush. The number of eggs is four."—*T. K. S.*

150. *CYANOCORAX AFFINIS*, Pelzeln; Scl. Cat. A. B. p. 45; Sharpe, Cat. iii. p. 121.

Cauca, Remedios. (Mus. S.-G.)

Iris yellow.

Eggs (no. 159) clay-brown, thickly spotted, especially at the larger end, with spots of several shades of yellowish brown: axis 1·35, diam. ·97.

"The nest is composed of sticks; and all I have seen have been placed with considerable skill in places difficult to find, generally a good way out on a branch. Though a noisy bird at all other times, it is usually quiet when near its nest."—*T. K. S.*



## Fam. TYRANNIDÆ.

151. MYIOTHERETES STRIATICOLLIS (Scl.), Cat. A. B. p. 197.  
Mus. S.-G.

One example in the sixth collection.

152. OCHTHODIETA FUMIGATA (Boiss.).

*Ochthæca fumigata*, Scl. Cat. p. 198.

Sta. Elena. (Mus. S.-G.)

Iris dark.

153. OCHTHÆCA FUMICOLOR (Scl.), Cat. A. B. p. 198.

Sta. Elena. (Mus. S.-G.)

Iris dark. Food, insects.

Eggs (no. 51) white, with a few small red-brown spots: axis .75, diam. .6.

154. OCHTHÆCA LESSONI (Scl.), Cat. A. B. p. 198.

Sta. Helena. (Mus. S.-G.)

Iris dark. Food, insects.

155. OCHTHÆCA CINNAMOMEIVENTRIS (Lafr.); Scl. Cat. A. B. p. 199.

Envigado and Sta. Helena. (Mus. S.-G.)

Iris dark. Food, insects.

Eggs (no. 58) white with large red spots, chiefly near the larger end: axis .77, diam. .55.

156. OCHTHÆCA DIADEMA (Hartl.); Scl. & Salv. Nomencl. p. 42.

*Mecocerculus diadema*, Scl. Cat. p. 199.

Sta. Helena. (Mus. S.-G.)

Iris dark. Food, insects.

Eggs (no. 73) white: axis .7, diam. .54.

"The nest is made entirely of moss lined with a few feathers, and is built in a bank, generally into a mass of growing moss. The bird lays four cream-white eggs."—T. K. S.

157. SAYORNIS CINERACEA (Lafr.); Scl. et Salv. Nomencl. p. 43.

*S. cineracea* et *S. latirostris*, Scl. Cat. p. 200.

Medellin, Frontino. (Mus. P. L. S. and S.-G.)

Eggs (no. 81) white: axis .8, diam. .6.

After comparing skins from Venezuela, Colombia, and Ecuador, we have come to the conclusion that they are all referable to one species; so that Sclater's *S. latirostris*, founded on specimens from the last locality, must be suppressed.

158. COPURUS LEUCONOTUS, Lafr.; Scl. Cat. A. B. p. 204.

Remedios. (Mus. S.-G.)

159. *TODIROSTRUM CINEREUM* (Linn.); Scl. Cat. A. B. p. 207.  
Medellin, Sta. Elena, Remedios. (Mus. S.-G.)  
Iris white. Insects in stomach.  
Eggs (no. 83) white: axis .64, diam. .49.
160. *TODIROSTEUM RUFICEPS*, Kaup; Scl. Cat. A. B. p. 207.  
Frontino. (Mus. S.-G.)  
Iris dark. Stomach contained insects.  
Eggs (no. 90) white, with a few very pale red spots: axis .63.  
diam. .48.
161. *EUSCARTHUS GRANADENSIS* (Hartl.); Scl. Cat. A. B.  
p. 209.  
Retiro, Envigado, Sta. Elena. (Mus. P. L. S. and S.-G.)
162. *HAPALOCERCUS ACUTIPENNIS*, Scl. et Salv. P. Z. S. 1873,  
p. 187.  
Medellin. (Mus. S.-G.)  
Iris dark.
163. *SERPAPHAGA CINEREA* (Strickl.); Scl. Cat. A. B. p. 211.  
Envigado, Frontino. (Mus. P. L. S. and S.-G.)  
Eggs (no. 84) creamy white: axis .64, diam. .5.
164. *MIONECTES STRIATICOLLIS* (Lafr. et d'Orb.); Scl. Cat.  
A. B. p. 213.  
Sta. Elena. (Mus. S.-G.)  
Insects in stomach.  
Eggs (no. 71) white: axis .8, diam. .6.
165. *MIONECTES OLEAGINEUS* (Licht.); Scl. Cat. A. B. p. 213.  
Remedios.  
Insects in stomach.
166. *LEPTOPOGON ERYTHROPS*, Scl. P. Z. S. 1862, p. 112.  
Sta. Elena, Medellin. (Mus. S.-G.)  
Mr. Salmon's skins agree with the typical specimens from Bogotá  
in Sclater's collection.
167. *LEPTOPOGON PÆCILOTIS*, Scl. P. Z. S. 1862, p. 111.  
Concordia. (Mus. P. L. S.)
168. *TYRANNULUS ELATUS* (Lath.); Scl. Cat. A. B. p. 215.  
Remedios. (Mus. S.-G.)
169. *TYRANNISCUS NIGRICAPILLUS* (Lafr.); Scl. Cat. A. B.  
p. 213.  
Sta. Elena. (Mus. S.-G.)  
Iris dark. Stomach contained insects.

170. *TYRANNISCUS CHRYSOPS*, *Sci. P. Z. S.* 1870, p. 842.

Retiro, Concordia, Sta. Elena. (Mus. P. L. S.)

171. *ELAINEA PAGANA* (Linn.); *Sci. P. Z. S.* 1870, p. 834.

Medellin. (Mus. P. L. S. and S.-G.)

Mr. Salmon sends us examples, with their eggs, of what he considers two different species; but both of them we refer to *E. pagana*.

Eggs (no. 1) pale salmon-colour, with a zone of several shades of red spots round the larger end: axis .82, diam. .65.

Eggs (no. 2) smaller, and less spotted: axis .72, diam. .58.

Mr. Salmon's notes on these two forms are as follows:—

"No. 1 builds a similar nest to the Cardinal, but larger, of dried grass, prettily ornamented on the outside with pieces of bark and white lichen, lined with feathers; and the situation also is the same. The eggs, two in number, are white, spotted at the larger end with grey and rust-brown, generally extending in a ring round the egg.

"The bird is easily distinguished from all others by its harsh cry: and it is more restless than any others of the family; it does not sit silently waiting for its prey, but is continually moving about.

"No. 2. The nest of this bird is built of coarse dry grass, lined with finer grass and, generally, with any moss or lichen. It is placed upon a horizontal bough near the extremity, at a normal height. The eggs are only two in number, cream-white, spotted at the larger end with small specks of purple and rust-red, often forming a ring."

172. *ELAINEA FRANTZII*, Lawrence, *Ann. L. N. Y.* vii. p. 173.

*Elainea pudica*, *Sci. P. Z. S.* 1870, p. 833.

Medellin, Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris dark. Food, insects. Nests on low branches.

Eggs (no. 17) white, with a few small red spots near the larger end: axis .77, diam. .59.

Having now received typical specimens of *E. frantzii*, we find that this Costa-Rican bird is not different from Sclater's *E. pudica* of Veragua and Colombia.

173. *MYIOZETETES TEXENSIS* (Giraud); *Sci. P. Z. S.* 1871, p. 753.

Envigado, Medellin.

Iris dark. Fruit in stomach.

Eggs (no. 37) white, spotted, especially at the larger end, with red: axis .82, diam. .62.

174. *RHYNCHOCYCLUS FULVPECTUS*, *Sci. P. Z. S.* 1876, p. 92.

Frontino. (Mus. S.-G.)

Stomach contained insects.

Eggs (no. 82) white, with an indistinct zone of small very pale red spots: axis .95, diam. .68.

Originally described from Ecuador specimens (*Fraser*), but also occurring in Bogotá collections. (Mus. S.-G.)

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## 175. MYIODYNASTES AUDAX (Gm.).

Sta. Elena, Frontino. (Mus. S.-G.)

Iris dark.

"The nest is made of fern-stalks and twigs, and is placed in the fork of a tree or high bush. The eggs are two, white, spotted with red."—*T. K. S.*

176. MYIODYNASTES CHRYSOCEPHALUS (Tsch.); Scl. Cat. A. B. p. 223.

Concordia. (Mus. P. L. S. and S.-G.)

177. CNIPODECTES SUBBRUNNEUS (Scl.); Scl. et Salv. P. Z. S. 1873, p. 281.

Remedios. (Mus. S.-G.)

Iris dark.

## 178. MYIOBIUS BARBATUS (Gm.).

*M. barbatus* et *M. xanthopygius*, Scl. Cat. A. B. p. 225.

Sta. Elena. (Mus. S. G.)

Under the name of *M. barbatus* we are now disposed to unite the Brazilian and more northern forms kept separate in Sclater's Catalogue. The Panama bird, *M. atricaudus*, Lawrence (*Ibis*, 1863, p. 183) is hardly different.

## 179. MYIOBIUS VILLOSUS, Scl. P. Z. S. 1860, pp. 93, 465.

Frontino.

In our 'Nomenclator' we have united this species to the Central-American form *M. sulphureipygius*, but are now inclined to recognize it as distinct, though very closely allied.

180. MYIOBIUS CINNAMOMEUS (Lafr. et d'Orb.); Scl. Cat. A. B. p. 226.

Concordia, Sta. Elena. (Mus. S.-G.)

Mr. Salmon's skins agree with specimens from Bogotá and Ecuador.

## 181. MYIOBIUS FLAVICANS, Scl. P. Z. S. 1860, p. 464.

Sta. Elena. (Mus S.-G.).

Iris dark; food, insects.

Mr. Salmon's skins agree with specimens from Ecuador and Bogotá. (Mus. P. L. S.)

## 182. MYIOBIUS NÆVIUS (Bodd.); Scl. Cat. A. B. p. 227.

Medellin. Food, insects; nests on low branches of trees.

Eggs (no. 16) salmon-colour, with large red blotches near the larger end: axis .65, diam. .5.

"At the extremity of the horizontal branch of a tree I have seen this nest beautifully constructed of coarse grass interwoven like basketwork with other materials, as moss and leaves. The body of the nest is formed of very long grass, which is carried along the

branch for several inches, twisted round and fixed in a very clever manner, as though the bird was afraid it would slip from the end of the bough and fall. The nests which I have seen have always been deep, I suppose to prevent the eggs from falling out when the wind blows, which would of course cause a considerable motion on account of the position in which they are placed. They were also well sheltered from the rain from the leaves above. The eggs are cream-colour with a few rust-coloured spots at the larger end."—*T. K. S.*

183. *PYROCEPHALUS RUBINEUS* (Bodd.); *Sci. Cat. A. B.* p. 227.

Medellin. (Mus. S.-G.).

Iris dark; food, insects; nests on low trees and shrubs.

Eggs (no. 3) creamy white, with a conspicuous zone round the middle of large red-brown and lilac spots: axis .72, diam. .57.

"This bird builds a pretty nest, the body of which is composed of dry grass, completely covered on the outside with lichen, and lined with feathers.

"The nest is generally placed on an out-spreading branch, and securely attached to the supporting stem by pieces of lichen and bark. It would be often difficult to discover, were it not that the male bird is generally perched silently on a tree or bush near, his beautiful crimson colour forming a conspicuous object amongst the green leaves.

"The female lays two eggs, with a ring of grey and sepia-brown blotches intermixed at the larger end."—*T. K. S.*

184. *EMPIDOCANES PÆCILURUS*, *Sci. P. Z. S.* 1862, p. 112.

One example, without exact locality, agreeing with the type in Mr. Sclater's collection. (Mus. S.-G.)

185. *CONTOPUS ARDESIACUS* (Lafr.); *Sci. et Salv. Nomencl.* p. 52.

Medellin and Sta. Elena. (Mus. P. L. S.).

186. *MYIARCHUS TYRANNULUS* (Müll.); *Sci. et Salv. Nomencl.* p. 52.

*Myiarchus ferox* auctt.

Retiro, Concordia, Sta. Elena.

Iris dark; food, insects; builds in hollow trees.

Eggs (no. 33) creamy-white, thickly streaked with longitudinal streaks of red-brown and a few large lilac blotches near the larger end: axis .9, diam. .7. (Mus. Brit.)

187. *TYRANNUS PIPIRI* (Vieill.); *Sci. Cat. A. B.* p. 236.

Medellin.

Iris dark.

This northern species descends to the Amazons (*P. Z. S.* 1866, p. 189) and Bolivia (*d'Orb.*). It also occurs in Bogotá collections. (Mus. P. L. S.)

188. *TYRANNUS MELANCHOLICUS* (Vieill.); *Scl. Cat. A. B.* p. 235.

Retiro, Medellin.

Iris dark; food, insects; builds in trees.

Eggs (no. 27) pale salmon-colour, spotted, especially in a zone round the larger end, with red-brown, red, and lilac spots: axis 1·0, diam. ·7. (*Mus. Brit.*)

"The nest of this bird is built upon a spreading branch near the top of low trees; it is made of small twigs lined with black dry fibrous roots, and is generally a slight structure. The eggs, two in number, are white tinged with pink, and spotted, mostly at the larger end, with blood-red. In *Tierra Fria* it breeds in the months of March and April, in *Tierra Caliente* in May and June. The young resemble the old ones, with the exception of the orange-coloured feathers on the head. It is a noisy, quarrelsome bird, continually attacking and driving away all intruders from its domain."—*T. K. S.*

189. *MILVULUS TYRANNUS* (Linn.).

Retiro, Medellin.

Eggs (no. 55) creamy white, spotted with distinct spots of dark red, especially at the larger end; axis ·9, diam. ·65. (*Mus. Brit.*)

"This species builds its nest on the spreading branches of trees, generally at no great height, making it of grass-stalks, roots, and fibres, intermixed with cotton, silk and a variety of other substances; sometimes it is lined with dry roots, at others entirely with grass. The male is almost invariably perched on some conspicuous branch while the female is sitting. Builds always in the open country, never in the forest."—*T. K. S.*

#### Fam. PIPRIDÆ.

190. *MASIVUS CORONULATUS*, *Scl. P. Z. S.* 1860, p. 91, et *Cat. A. B.* p. 247, pl. xix.

In 1875 Mr Salmon sent home a single skin of the male of this form, now in Sclater's collection. It differs from typical examples from Ecuador in having the thick flattened horny ends of the feathers which terminate the crest of a pale brown instead of a red colour; but we are not inclined to separate the form specifically on the faith of this single specimen.

191. *CHLOROPIPO FLAVICAPILLA* (Scl.), *Cat. A. B.* p. 247.

Medellin. (*Mus. S.-G.*)

Mr. Salmon's specimens differ from Bogotá skins in having the yellow of the upper surface confined to the crown and nape, the back and cheeks being olivaceous; otherwise the birds agree, and are hardly separable specifically.

192. *PIPRA AURICAPILLA*, *Licht.*; *Scl. Cat.* p. 249.

Remedios and Neche. (*Mus. S.-G.*)

Iris white.

193. *PIPPA CYANEOCAPILLA*, Hahn; *Sci. Cat.* p. 249.

Medellin, Remedios, and Neche. (Mus. S.-G.)

Iris dark.

194. *MACHÆROPTERUS STRIOLATUS* (Bp.); *Sci. Ibis*, 1862, p. 176.

Medellin, Remedios, and Neche. (Mus. S.-G.)

Iris dark.

195. *CHIROMACHERIS MANACUS* (Linn.); *Sci. Cat.* p. 252.

Remedios and Neche. (Mus. Brit.)

Iris red.

Eggs (no. 155) reddish white, thickly blotched with longitudinal blotches of dull red, the blotches being almost confluent in a zone round the larger end: axis .82, diam. .6. (See Plate XLII. fig. 11.)

"Builds a slight shallow nest of grasses, which is suspended from the fork of a branch in low shrubs."—*T. K. S.*

196. *CHIROMACHERIS VITELLINA* (Gould); *Sci. Cat.* p. 253.

Cauca, Remedios. (Mus. Brit.)

Eggs (no. 105) creamy white (reddish in some specimens), thickly blotched with chocolate-red: blotches in some specimens almost, in others quite confluent at the larger end: axis .85, diam. .6. (See Plate XLII. fig. 10.)

This is a more southern locality than has yet been recorded for the present species.

#### Fam. COTINGIDÆ.

197. *TITYRA PERSONATA*, Jard. et Selb.; *Sci. Cat.* p. 238.

Remedios and Neche. (Mus. Brit.)

Iris dark red. Fruit in stomach.

Egg (no. 95) white: axis 1, diam. .8.

"The nest is placed almost on a level with the entrance in the hole of a decayed tree, and composed of a little dry grass."—*T. K. S.*

198. *TITYRA ALBITORQUES*, Du Bus; *Sci. Cat.* p. 239; *Sci. et Salv. P. Z. S.* 1867, p. 757.

Remedios. (Mus. P. L. S.)

199. *HADROSTOMUS HOMOCROUS*, *Sci. Cat. A. B.* p. 240.

Remedios. (Mus. Brit.)

Eggs (no. 103) chocolate-brown, with a zone of indistinct spots round the larger end: axis .9, diam. .65. (See Plate XLII. fig. 12.)

"A large massive nest for so small a bird, has an entrance at the side; but there is nothing artistic or pretty about it; it is simply a mass of almost any substance that can be found, no doubt made in that way to protect the eggs and young from the heavy rains, it being always placed in a very exposed position at the extremity of the branch of a high tree. The bird seems to take a long time in building its nest; one I observed was more than a month before it had eggs. I had the pleasure of seeing the first piece of grass placed,

and was surprised at the speed with which the body of the nest was formed; the greater time seemed to be spent in lining and finishing it."—*T. K. S.*

200. *PACHYRHAMPHUS CINEREIVENTRIS*, Scl. Cat. A. B. p. 242.

*P. dorsalis*, *ibid.* p. 243.

Sta. Elena.

Food, insects.

It is not possible, we think, to keep separate the two forms distinguished in Sclater's Catalogue under the above-given names.

201. *PACHYRHAMPHUS CINNAMOMEUS*, Lawr. Ann. L. N. Y. vii. p. 295.

Remedios.

The Brown Becards of this genus have been long a source of trouble to us, the question being whether they are distinct species or females of the group of *P. niger*. Sclater, in his Review of *Tityrinae*<sup>1</sup>, adhered to the former opinion; subsequently<sup>2</sup> he adopted Dr. Cabanis's view that the brown birds are either females or young males<sup>3</sup>. It will be impossible to decide this question satisfactorily, except by the aid of resident observers; but of late we have been inclined to swing round to Sclater's original theory.

Mr. Salmon's specimens go to support this view, the one marked "male" showing the second spurious primary, the other marked "female" being without it, *i. e.* having this primary of its normal length.

On the whole we think it best for the present to employ Mr. Lawrence's name for this northern red form (which extends from Guatemala to Colombia), and the term *rufus* (Bodd.) for the Brazilian bird, which seems to be its southern representative.

If the brown birds are females and young males of the black forms, we ought occasionally to meet with intermediate specimens. But amongst the multitudes that have come before us no such intermediate specimen has ever occurred.

202. *PACHYRHAMPHUS VERSICOLOR* (Hartl.); Scl. Cat. p. 243.

(Mus. S.-G.)

203. *LATHRIA FUSCO-CINEREA* (Lafr.); Cab. et Hein. Mus. Hein. ii. p. 101; Scl. et Salv. Nomencl. p. 56.

Alegria. (Mus. S.-G.)

204. *LATHRIA UNIRUFA* (Scl.).

*Lipaugus unirufus*, Scl. Cat. A. B. p. 244.

Remedios, Neche.

Food, insects.

The occurrence of this Central-American species so far south of Panama is new to us; but it has been already recorded by Mr. Cassin from the river Truando (Pr. Acad. Phil. 1860, p. 143).

<sup>1</sup> See P. Z. S. 1857, p. 79.

<sup>2</sup> Cat. A. B. p. 242.

<sup>3</sup> Mus. Hein. ii. p. 88.



205. *AULIA RUFESCENS* (Scl.).*Lipaugus rufescens*, Scl. P. Z. S. 1857, p. 296.

Remedios. (Mus. S.-G.)

A single immature specimen seems to be referable to this Central-American form.

206. *LIPAUGUS HOLERYTHRUS*, Scl. et Salv. P. Z. S. 1860, p. 211.

Neche.

Food, insects.

207. *RUPICOLA SANGUINOLENTA*, Gould; Scl. et Salv. Ex. Orn. p. 29, pl. xv.

Concordia, Frontino. (Mus. S.-G.)

Iris yellow.

Eggs (no. 156) pale buff, spotted with various-sized spots of shades from red-brown to pale lilac, chiefly at the larger end: axis 1.85, diam. 1.35.

Mr. Salmon's skins of *Rupicola* belong to the form described by Mr. Gould as *R. sanguinolenta*, though perhaps not quite so dark as examples from Ecuador. Bogotá skins (Mus. S.-G.) belong to the lighter form, *R. peruviana*.

The egg of *Rupicola* was obtained by Goudot in Colombia<sup>1</sup>, and is figured by Des Murs in the 'Magasin de Zoologie,' 1843, Ois. pl. 37. M. Des Murs's figure agrees sufficiently well with Mr. Salmon's specimens, which, however, are not so thickly spotted.

Mr. Salmon thus describes his visit to the breeding-place of this bird:—"I once went to see the breeding-place of the Cock-of-the-Rock; and a darker or wilder place I have never been in. Following up a mountain-stream in the district of Frontino, the gorge became gradually more enclosed and more rocky, till I arrived at the mouth of a cave, with high rock on each side and overshadowed by high trees, into which the sun never penetrated. All was wet and dark, and the only sound heard the rushing of the water over the rocks. We had hardly become accustomed to the gloom when a nest was found, a dark bird stealing away from what appeared to be a lump of mud upon the face of the rock. This upon examination proved to be a nest of the 'Cock-of-the-Rock' containing two eggs; it was built upon a projecting piece, the body being made of mud or clay, then a few sticks, and on the top lined with green moss. It was about five feet from the water. I did not see the male bird; nor indeed have I hardly ever seen male and female birds together, though I have seen both sexes in separate flocks."

208. *PIPREOLA RIEFFERI* (Boiss.); Scl. Ibis, 1878, p. 166.

Retiro, Medellin, Sta. Elena. (Mus. S.-G.)

Stomach contained fruit.

Eggs (no. 43) pale salmon-colour, with a few dark red-brown spots: axis 1, diam. .8. (See Plate XLIII. fig. 7.)

<sup>1</sup> See Rev. Zool. 1843, p. 1.

209. *PIPREOLA AUREIPECTUS* (Lafr.); Scl. Ibis, 1878, p. 171.  
(Mus. P. L. S.)

Mr. Salmon's skins fully agree with others from Venezuela. We are rather surprised to find this species so far west. We have never seen it in Bogotá collections.

210. *AMPELION CINCTUS* (Tsch.); Scl. Cat. p. 253.  
Frontino. (Mus. S.-G.)

211. *HELIOCHERA RUBROCRISTATA* (Lafr. et d'Orb.); Scl. Cat. A. B. p. 255.

Sta. Elena. (Mus. S.-G.)

Iris dark; stomach contained insects.

212. *HELIOCHERA RUFAXILLA* (Tsch.)  
*Ampelion rufaxilla*, Cab. in Tsch. Faun. Per. Aves, p. 137, pl. vii.  
fig. 2.

*Heliochera rufaxilla*, Scl. et Salv. Nomencl. p. 58.

Sta. Elena. (Mus. S.-G. and P. L. S.)

Iris dark; stomach contained insects.

There is a Bogotá skin of this bird in the Paris Museum.

213. *QUERULA CRUENTA* (Bodd.); Scl. Cat. A. B. p. 257.

Pocune, Remedios. (Mus. S.-G.)

Stomach contained fruit.

214. *PYRODERUS ORENOCENSIS* (Lafr.); Scl. Cat. A. B. p. 259.

Concordia, Frontino, Sta. Elena. (Mus. S.-G.)

Stomach contained fruit.

Eggs (no. 140) pale buff, spotted with various shades from dark red-brown to pale lilac: axis 1.9, diam. 1.3. (See Plate XLIII. fig. 7.)

"The nest, composed of sticks, is generally built rather high in the fork of a slender branch, and is exceedingly slight and small, not much larger than the nest of the Common Ring-Dove. By frightening the bird from her nest, I have caused the eggs to fall to the ground. The bird is exceedingly fierce in defending its nest from Hawks. I found the first nest I ever saw entirely from seeing a Red-necked Fruit-Crow fly out at a passing Hawk."—T. K. S.

#### Family DENDROCOLAPTIDÆ.

215. *SCLERURUS CAUDACUTUS*, Vieill.; Scl. et Salv. P. Z. S. 1867, p. 573.

Frontino. (Mus. P. L. S.)

Agrees with Bogotá and Cayenne specimens.

216. *SYNALLAXIS FRONTALIS*, Pelz.; Scl. P. Z. S. 1874, p. 8.

Concordia, Retiro, Medellin, Sta. Elena. (Mus. S.-G.)

Iris dark; stomach contained insects.

Eggs (no. 49) white: axis .85, diam .65.

217. *SYNALLAXIS ALBESCENS*, Temm.; *Scl. P. Z. S.* 1874, p. 9.

Medellin. (Mus. S.-G.)

Iris dark; stomach contained insects.

Eggs (no. 40) of a very pale greenish blue, nearly white: axis .88, diam. .65.

"The nest, which is placed in a tree or high bush, 6 or 8 feet from the ground, is made of sticks and twigs; and the eggs are placed on a few small green leaves. It is very much the shape of a pear placed horizontally, with an extended tunnel at the smaller end.

"I have seen the nest as large as that of an English Magpie, and as firmly made, though the bird is not larger than a Sparrow. The body of the nest is composed of sticks, many of them from four to six inches in length and a quarter of an inch in diameter; the tunnel entrance, which is often of considerable length, is composed of fine twigs beautifully interlaced, the entrance only just admitting the body of the bird; it is sometimes straight, sometimes winding. The top of the nest is roofed with a mass of large leaves, a protection against the heavy rains. Altogether it is a remarkable construction; and it would be interesting to know how so small a bird can carry and fix such large sticks; but the bird at this time is exceedingly shy, always keeping at a distance from its nest when any one is near, even if carefully hidden from view.

"The nest is difficult to approach, being placed where the underwood is very thick; and the eggs can only be obtained by making an opening on one side, which is not an easy operation."—*T. K. S.*

218. *SYNALLAXIS PUDICA*, *Scl. P. Z. S.* 1874, p. 10.

Remedios. (Mus. S.-G.)

Iris dark; stomach contained insects.

Eggs (no. 99) pale greenish blue: axis .85, diam. .65.

219. *SYNALLAXIS UNIRUFA*, Lafr.; *Scl. P. Z. S.* 1874, p. 14.

In Mr. Salmon's third collection (Mus. P. L. S.), without exact locality.

220. *SYNALLAXIS ERYTHROPS*, *Scl. P. Z. S.* 1874, p. 19.

Frontino. (Mus. S.-G.)

Iris dark; stomach contained insects.

Eggs (no. 87) white: axis .95, diam. .65.

221. *PSEUDOCOLAPTES BOISSONEAUTI* (Lafr.); *Scl. Cat. A. B.* p. 156.

Frontino, Sta. Elena. (Mus. S.-G.)

Iris dark. Food, insects; nests in holes of trees.

Eggs (no. 30) white: axis 1.14, diam. .8.

222. *THRIPADECTES FLAMMULATUS* (Eyton); *Scl. Cat. A. B.* p. 157.

Frontino. (Mus. S.-G.)

Iris dark. Stomach contained insects.

Eggs (no. 86) white: axis 1.35, diam. .9.

223. AUTOMOLUS HOLOSTICTUS, Scl. et Salv. P. Z. S. 1875, p. 542.

Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris dark.

Eggs (no. 60) white: axis 1.15, diam. .85.

224. AUTOMOLUS IGNOBILIS, sp. nov.

*Saturate rubiginoso-brunneus, subtus dilutior; lateribus capitis et gutture toto ad pectus rufescenti variegatis, et striis scapas plumarum occupantibus notatis; cauda obscure castanea unicolori; subalaribus et remigum marginibus interioribus late ochraceo-rufis. Long. tota 7.8, alae 3.5, caudæ rectr. ext. 2.0, med. 3.0.*

*Hab.* in St. Antioquiæ, reipubl. Columbianæ.

*Mus.* P. L. S.

*Obs.* Sp. colore uniformi, gutture obsolete striato, insignis; crassitie *A. cervinularis* et huic quoad dorsi picturam non dissimilis.

Frontino. Iris dark; stomach contained insects.

Mr. Salmon obtained but one specimen of this bird, which seems to belong to an unrecognized species.

Though at first we took it for a young *A. holostictus*, accurate examination convinces us that such cannot be the case; and the bird seemed to be quite in adult plumage. The tail is much shorter than in *A. holostictus*, and the bill shorter, higher, and more compressed. The wings are short and much rounded, the third, fourth, and fifth primaries being nearly equal and longest. On the whole the species goes best next to *A. rufo-brunneus*<sup>1</sup>, of Costa Rica.

Eggs (no. 88) white: axis 1.16, diam. .86.

225. AUTOMOLUS PALLIDIGULARIS, Lawr. Ann. L. N. Y. vii. p. 465.

Remedios. (Mus. S.-G.) Iris dark.

This is a Veraguan and Panama species. Its extension so far south is new to us.

226. PHILYDOR ERYTHRONOTUS, Scl. et Salv. Nomencl. p. 160.

Sta. Elena. (Mus. S.-G.)

A single specimen, agreeing with the type (from Bogotá) in Sclater's collection.

227. ANABAZENOPS TEMPORALIS, Scl. Cat. A. B. p. 159.

Concordia. (Mus. P. L. S.)

It is perhaps somewhat doubtful whether this species can be kept separate from the Central-American form *A. variegaticeps*.

228. XENOPS RUTILUS, Licht.

*X. rutilus* et *X. heterurus*, Scl. Cat. A. B. p. 159.

Sta. Elena. (Mus. S.-G.)

Iris dark. Stomach contained insects.

<sup>1</sup> *Philydor rufo-brunneus*, Lawr. Ann. Lyc. N. Y. vol. viii. p. 126.

229. *XENOPS GENIBARBIS*, Ill.

*X. genibarb**s*, *X. littoralis*, et *X. mexicanus*, Scl. Cat. A. B. p. 159.

Remedios. (Mus. S.-G.)

Iris dark.

It seems impossible to separate satisfactorily the various local forms of this and the preceding species of *Xenops*; and in our 'Nomenclator' we have reunited them.

230. *SITTASOMUS OLIVACEUS*, Max.; Scl. et Salv. P. Z. S. 1868, p. 630.

Remedios.

Iris dark. Stomach contained insects.

231. *MARGARORNIS PERLATA* (Less.); Salvin, Ibis, 1874, p. 322.

Sta. Elena. (Mus. S.-G.)

Eggs (no. 62) white: axis .75, diam. .5.

232. *MARGARORNIS BRUNNESCENS*, Scl. Cat. A. B. p. 161.

Sta. Elena. (Mus. S.-G.)

Iris dark. Stomach contained insects.

233. *GLYPHORHYNCHUS CUNEATUS* (Licht.); Scl. et Salv. P. Z. S. 1873, p. 270.

Remedios.

234. *DENDROCINCLA TYRANNINA* (Lafr.); Scl. Cat. A. B. p. 162.

Sta. Elena. (Mus. S.-G.)

235. *DENDROCOLAPTES VALIDUS*, Scl. et Salv. P. Z. S. 1866, p. 184.

Concordia, Medellin, Frontino, and Sta. Elena. (Mus. S.-G.)

Iris dark.

Eggs (no. 161) white: axis 1.15, diam. .85.

"Nest is made in a hole of a tree, and the number of eggs two."  
—T. K. S.

236. *XIPHOCOLAPTES PROMEROPHIRHYNCHUS* (Less.); Scl. Cat. A. B. p. 163.

Sta. Elena, Remedios. (Mus. S.-G. and P. L. S.)

Iris dark.

237. *DENDRORNIS TRIANGULARIS* (Lafr.); Scl. Cat. A. B. p. 165.

Sta. Elena.

Iris dark.

238. *DENDRORNIS LACRYMOSA*, Lawr. Ann. L. N. Y. viii. p. 467.

Remedios. (Mus. P. L. S.)

This Central-American form has not previously been recorded so

far south. The single skin in Mr. Salmon's seventh collection (Mus. P. L. S.) cannot be separated, although the spots on the lower surface are not quite so distinctly rounded.

239. *PICOLAPTES LACRYMIGER* (Lafr.); *Scl. Cat. A. B.* p. 166.

Medellin, Sta. Elena, Envigado, Frontino. (Mus. S.-G.)

Stomach contained insects.

Eggs (no. 63) white: axis 1.05, diam. .85.

240. *PICOLAPTES ALBO-LINEATUS*, Lafr. *Rev. Zool.* 1850, p. 278; *Scl. et Salv. P. Z. S.* 1868, p. 167.

Remedios, Sta. Elena. (Mus. P. L. S. and S.-G.)

Mr. Salmon's skin agrees with Bogotá and Venezuelan specimens which we refer to this species.

241. *XIPHORHYNCHUS TROCHILIROSTRIS* (Licht.); *Scl. Cat. A. B.* p. 167.

Remedios. (Mus. S.-G.)

Iris dark.

Eggs (no. 156) white, nearly round: axis 1, diam. .84.

"The only nest I saw was inside a decayed tree, which had been cut off about three feet from the ground, and become hollow to the roots, so that the nest had no protection from the rain."—*T. K. S.*

242. *XIPHORHYNCHUS PUSILLUS*, *Scl.*; *Salvin, P. Z. S.* 1870, p. 193.

Concordia. (Mus. S.-G.)

#### Fam. FORMICARIIDÆ.

243. *CYMBILANIUS LINEATUS* (Vieill.); *Scl. Cat.* p. 170.

Remedios and Neche.

Iris red. Stomach contained insects.

244. *THAMNOPHILUS TRANSANDEANUS*, *Scl. Cat.* p. 172.

Remedios, Neche. (Mus. S.-G. and P. L. S.)

Iris red.

245. *THAMNOPHILUS NÆVIUS* (Gm.); *Scl. Cat.* p. 173.

Neche. (Mus. S.-G.)

Iris white.

246. *THAMNOPHILUS DOLIATUS* (Linn.); *Scl. Cat.* p. 173.

Examples of this widely diffused species were in Mr. Salmon's fifth collection.

247. *THAMNOPHILUS MULTISTRIATUS*, Lafr.; *Scl. Cat. A. B.* p. 175.

Concordia, Medellin. (Mus. S.-G.)

Iris white. Food, insects. Nest hanging from trees.

Eggs (no. 31) whitish, thickly spotted and streaked at the larger end with red-brown: axis 1, diam. .65.

248. *DYSITHAMNUS SEMICINEREUS*, Scl. Cat. A. B. p. 177.

Concordia.

249. *DYSITHAMNUS UNICOLOR*, Scl. Cat. A. B. p. 178.

Sta. Elena. (Mus. S.-G.)

Stomach contained insects.

Eggs (no. 44) creamy-white, sparsely spotted with small red spots, and with a zone of large blotches of the same colour round the middle: axis .98, diam. .67. (See Plate XLIII. fig. 9.)

250. *MYRMOTHERULA SURINAMENSIS* (Gm.); Scl. Cat. p. 179.

Remedios. (Mus. S.-G.)

Iris dark. Stomach contained insects.

Eggs (no. 102) white: axis .8, diam. .65.

"The nest is made of very fine roots and grass, and placed in low bushes. It is a slight network hanging at the end of a thin bough, very deep, and suspended between a fork, with the natural leaves of the shrub or bush above to protect it from the rain.

"The bird is a busy insect-hunter, but difficult to observe on account of its small size and the nature of its haunts."—*T. K. S.*

251. *MYRMOTHERULA FULVIVENTRIS*, Lawr. Ann. L. N. Y. vii. p. 468; Scl. et Salv. P. Z. S. 1864, p. 356; Salv. Ibis, 1874, p. 311.

Remedios. (Mus. S.-G.)

252. *MYRMOTHERULA MELÆNA* (Scl.), Cat. A. B. p. 180.

Nече. (Mus. S.-G.)

Iris dark.

253. *FORMICIVORA CAUDATA*, Scl. Cat. A. B. p. 182.

Sta. Elena. (Mus. S.-G.)

Iris dark.

254. *FORMICIVORA CONSOBRINA*, Scl. Cat. A. B. p. 183.

Pocune. (Mus. S.-G.)

255. *RAMPHOCÆNUS RUFIVENTRIS* (Bp.); Scl. Cat. A. B. p. 184.

Sta. Elena. (Mus. P. L. S.)

Iris red. Food, insects. Nests in low bushes.

256. *RAMPHOCÆNUS CINEREIVENTRIS*, Scl. P. Z. S. 1855, p. 76, pl. lxxxvii.

*R. semitorquatus*, Lawr. Ann. L. N. Y. vii. p. 469 (1862); Salvin, P. Z. S. 1867, p. 145.

Mus. P. L. S.

A single example of this *Ramphocænus* without label is in the eighth collection. The type of Sclater's species was procured near Pasto; and it is of interest to get a specimen from an intermediate locality between that place and Panama, the locality of *R. semitor-*

*quatus* of Lawrence. An examination of Sclater's type in the Derby Museum, Liverpool, and a comparison of it with the present example and others from Panama, have brought us to the conclusion that Salvin's suspicions (*l. s. c.*) as to the identity of the two species were well founded. The extent of the slight postocular spot has been somewhat magnified in Sclater's figure; and though this spot is hardly apparent in Mr. Salmon's specimen, it does not seem to us to be sufficient to keep the two birds distinct.

257. *CERCOMACRA NIGRICANS*, Scl. P. Z. S. 1858, p. 245.

Remedios. (Mus. S.-G.)

Iris dark. Stomach contained insects.

Eggs (no. 101) mahogany-colour, mottled with darker shades of the same colour: axis  $\cdot 85$ , diam.  $\cdot 6$ .

"The nest, made of dry grasses, is placed between a fork at the extremity of the boughs of low bushes."—*T. K. S.*

258. *MYRMECIZA EXSUL*, Scl. Cat. A. B. p. 187.

Neche. (Mus. S.-G.)

Iris dark. Stomach contained insects.

259. *PITHYS LEUCASPIS* (Scl.), Cat. A. B. p. 189.

Remedios, Neche. (Mus. S.-G.)

Iris dark.

260. *FORMICARIUS HOFFMANNI*, Cab.; Finsch. P. Z. S. 1870, p. 568.

Remedios. (Mus. S.-G.)

Iris dark.

261. *GRALLARIA RUFICEPS*, Sclater, P. Z. S. 1873, p. 279, et *Ibis*, 1877, p. 444, pl. viii.

Medellin, Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris dark. Food, insects.

Eggs (no. 40) rich dark greenish blue: axis  $1\cdot45$ , diam.  $1\cdot1$ . (See Plate XLIII. fig. 5.)

262. *GRALLARIA FLAVO-TINCTA*, Scl. *Ibis*, 1877, p. 445, pl. ix. Frontino. (Mus. P. L. S.)

263. *GRALLARIA RUFO-CINEREA*, sp. nov.

*Supra saturate cinnamomeo-rufa, subtus obscure cinerea; capitis et cervicis lateribus dorso concoloribus; remigibus intus nigris extus rufis; cauda omnino rufo-cinnamomea; rostro nigro; pedibus carnis.* Long. tota  $6\cdot0$ , alæ  $3\cdot4$ , caudæ  $1\cdot8$ , tarsi  $1\cdot7$ .

*Hab.* Sta. Elena in prov. Antioquiæ (Salmon).

*Mus.* P. L. S.

*Obs.* Sp. crassitie *G. rufulam* paulo excedens, coloribus omnino diversa.

Iris dark. Food, insects.

But one example of the fine new *Grallaria* is in Mr. Salmon's eighth



collection. It must be placed amongst the "uniformes" of Sclater's arrangement (Ibis, 1877) between *G. griseinucha* and *G. rufula*.

264. *GRALLARIA RUFICAPILLA* (Lafr.); Scl. Ibis, 1877, p. 447.

Concordia, Sta. Elena. (Mus. S.-G.)

Iris dark. Stomach contained insects.

Eggs (no. 111) greenish-blue: axis 1.23, diam. 1.04. (See Plate XLIII. fig. 6.)

"In the morning, and shortly before sunset, may be heard a melancholy cry as this Ant-Thrush creeps amongst the brushwood. Many times have I followed to obtain a specimen, and after a tough scramble of an hour given it up for a bad job. At one time you seem to stand right upon it, and a moment after you hear it 4 yards off; again you reach the spot, and you hear it 20 yards behind you; you return, then it is on the right; soon after you hear it on the left. At first you imagine the bird has the power of a ventriloquist; but by dint of patience and watching you may see it creeping swiftly and silently among the grass and brushwood in places where it has to pass a rather more open spot, and the mystery is explained.

"The nest is also difficult to obtain: it is placed at some height from the ground, and made of a mass of roots, dead leaves, and moss, lined with roots and fibres. The eggs are two in number, rather round and blue."—*T. K. S.*

265. *GRALLARICULA NANA* (Lafr.); Scl. et Salv. Nomencl. p. 76.

*Grallaria nana*, Lafr. R. Z. 1842, p. 334.

Sta. Elena. (Mus. S.-G.)

266. *GRALLARICULA CUCULLATA* (Sclater), Scl. et Salv. Nomencl. p. 76.

*Conopophaga cucullata*, Scl. P. Z. S. 1856, p. 29, pl. 119, et 1858, p. 287, et Cat. A. B. p. 194.

Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris dark. Stomach contained insects.

Eggs (no. 75) pale coffee-colour, spotted and blotched with dark red-brown spots: axis .8, diam. .65.

This little bird does not range very satisfactorily either in *Grallaricula* or in *Conopophaga*, where it was first placed by Sclater, but is best arranged in the former genus, being not very far in structure from *G. flavirostris*. Mr. Salmon's specimens have the rufous head and throat not nearly so decided as in Sclater's type (which is a Bogotá skin); and the tarsi are slightly longer. The rufous wing-edgings and the red tint in the middle of the belly are likewise absent in Mr. Salmon's specimen, which, though marked *male*, must, we think, if really of the same species, be a female. The figure (P. Z. S. 1856, pl. 119) is much too brightly coloured.

## Fam. PTEROPTOCHIDÆ.

267. *SCYTALOPUS MAGELLANICUS* (Lath.); Sclater, Ibis, 1874, p. 193.

Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris dark. Stomach contained insects.

Eggs (no. 69) white: axis .9, diam. .7.

Mr. Salmon's skins cannot be distinguished from examples from Ecuador in Sclater's collection.

"The nest is placed in a mass of moss on a bank; it is also composed entirely of moss. The female lays two eggs, large for the size of the bird, and white. I was first attracted to this bird by a harsh cry continually repeated near me, and immediately looked round to discover what animal it could be, expecting something of considerable size, but, after carefully searching, saw what appeared a small black mouse creeping along the ground. Upon killing it I found it to be a specimen of this bird."—*T. K. S.*

268. *ACROPTERNIS ORTHONYX* (Lafr.); Sclater, Ibis, 1874, p. 204.

Sta. Elena. (Mus. S.-G.)

Iris dark. Stomach contained insects.

## Fam. TROCHILIDÆ.

269. *ANDRODON ÆQUATORIALIS*, Gould, Ann. and Mag. N. H. ser. 3, vol. xii. p. 247 (1863).

Remedios. (Mus. S.-G.)

A single skin of this remarkable species, which was previously only known as an inhabitant of Ecuador.

270. *GLAUCIS HIRSUTA* (Gm.); Gould, H. B. i. pl. v.; Salv. and Elliot, Ibis, 1873, p. 276.

Santa Elena. (Mus. S.-G.)

271. *PHAETHORNIS LONGIROSTRIS* (Less. et Delattre); Gould, H. B. i. pl. xix.; Salv. & Elliot, Ibis, 1873, p. 5.

Remedios. (Mus. S.-G.)

272. *PHAETHORNIS SYRMATOPHORUS*, Gould, H. B. i. pl. xx.

Sta. Elena, Medellin. (Mus. S.-G.)

273. *LAMPORNIS VIOLICAUDA* (Bodd.); Elliot, Ibis, 1872, p. 351.

*L. mango*, Linn.; Gould, H. B. ii. pl. lxxiv.

(Mus. P. L. S.)

274. *LAFRESNAYA GAYI* (Bourc.); Gould, H. B. ii. pl. lxxxvi.

Sta. Elena. (Mus. S.-G.)

275. *HEMISTEPHANIA LUDOVICÆ* (Bourc. et Muls.); Gould, H. B. ii. pl. lxxxviii.

Sta. Elena. (Mus. S.-G.).

*Doryphora* being the name of a well-known genus of Phytophagous Coleoptera, cannot continue to be used for this bird and its allies; Reichenbach's *Hemistephania* (Aufz. d. Colibris, p. 9, 1853) must therefore take its place.

276. *CHALYBURA BUFFONI* (Less.); Gould, H. B. ii. pl. lxxxix. Remedios, Sta. Elena. (Mus. S.-G.)

277. *PHÆOLÆMA RUBINOIDES* (Bourc. et Muls.); Gould, H. B. iv. pl. ccixviii. (Mus. P. L. S.)

278. *PANOPLITES FLAVESCENS* (Bourc.); Gould, H. B. ii. pl. cxī. Medellin. (Mus. P. L. S. and S.-G.)

279. *FLORISUGA MELLIVORA* (Linn.); Gould, H. B. ii. pl. cxiii. Remedios.

280. *ACESTRURA MULSANTI* (Bourc.); Gould, H. B. iii. pl. cxlv. Medellin. (Mus. S.-G.)

281. *STEGANURA UNDERWOODI* (Less.); Gould, H. B. iii. pl. cxlii. Sta. Elena, Medellin. (Mus. S.-G.)

282. *CYNANTHUS MOCOA* (Delattre et Bourc.); Gould, H. B. iii. pl. clxxiii. Sta. Elena. (Mus. S.-G. and P. L. S.)

This is the most northern locality yet recorded for this green-tailed *Cynanthus*.

283. *METALLURA TYRIANTHINA* (Bourc.); Gould, H. B. iii. pl. cxcv. Sta. Elena.

284. *ADELOMYIA CERVINA*, Gould, Ann. & Mag. Nat. Hist. ser. 4, x. p. 453. Medellin. (Mus. S.-G.)

285. *HELIOTHRIX BARROTI* (Bourc.); Gould, H. B. iv. pl. ccxvi. Remedios.

286. *HELIOTRYPHA PARZUDAKII* (Longuem.); Gould, H. B. iv. pl. ccxi. Sta. Elena. (Mus. S.-G.)

The nest is composed chiefly of moss, to which is attached outwardly pieces of lichen. The inside is thickly lined with the pubescence of the base of the fronds of ferns.

287. *PETASOPHORA ANAIS* (Less.); Gould, H. B. iv. pl. ccxxiv. Sta. Elena, Medellin. (Mus. S.-G.)

288. *PETASOPHORA CYANOTIS* (Bourc.); Gould, H. B. iv. pl. ccxxviii.

Sta. Elena.

289. *HELIANTHEA TYPICA*, Bp.; Gould, H. B. iv. pl. ccxxxv.

290. *BOURCIERIA TORQUATA* (Boiss.); Gould, H. B. iv. pl. celi.

Sta. Elena. (Mus. S.-G.)

The nest of this species is composed outwardly of moss, and thickly lined with fine pubescence from the bases of fern-fronds.

291. *LAMPROPYGIA COLUMBIANA*, Elliot, Ibis, 1876, p. 57.

Frontino, Sta. Elena, Medellin. (Mus. S.-G.)

These specimens agree with the Bogotá examples upon which Mr. Elliot founded the name *L. columbiana*, and present the slight differences by which it is to be distinguished from the Venezuelan race, the true *L. caligena*, Lesson.

292. *HELIOMASTER LONGIROSTRIS* (Vicill.); Gould, H. B. iv. pl. cclix.

293. *ERIOCNEMIS AURELIÆ* (Bourc.); Gould, H. B. iv. pl. cclxxxiii.

Sta. Elena, Medellin. (Mus. S.-G.)

294. *ERIOCNEMIS LUGENS* (Gould); H. B. iv. pl. cclxxxii.

The nest of this species is composed chiefly of moss, and lined with the coarser portions of the pubescence from the base of the fronds of ferns.

295. *CYANOMYIA FRANCIÆ* (Bourc.); Gould, H. B. v. pl. cclxxxvii.

(Mus. P. L. S.)

296. *AMAZILIA RIEFFERI* (Bourc.); Gould, H. B. v. pl. cccxi.

A nest sent is a deep structure composed mostly of *Bombax* seeds, to which are attached on the outside bits of lichen.

297. *SAUCEROTTIA WARSZEWIEZI* (Cab. & Heine).

*Hemithylaca warzewiezii*, Cab. et Heine, Mus. Hein. iii. p. 38.

(Mus. S.-G.)

298. *SAUCEROTTIA TYPICA*, Bp.; Gould, H. B. v. pl. cccxxi.

(Mus. S.-G.)

299. *JULIAMYIA TYPICA*, Bp.; Gould, H. B. v. pl. cccxxxvii.

300. *DAMOPHILA AMABILIS* (Gould); Gould, H. B. v. pl. cccxli.

(Mus. S.-G.)

301. *CHLOROSTILBON ANGUSTIPENNIS* (Fraser); Gould, H. B. v. pl. cccliii.

Medellin. (Mus. S.-G.)

The nest of this species brought home by Mr. Salmon is composed chiefly of the seed of *Bombax ceiba*, to which small leaves and bits of moss are stuck on the outside. It was apparently attached to the extremity of a branch of a tree, and is a moderately deep structure, but has no long outside appendages.

Fam. CYPSELIDÆ.

302. *PANYPTILA CAYANENSIS* (Gm.); Scl. P. Z. S. 1865, p. 606.

One specimen, without exact locality. (Mus. S.-G.) There is a Bogotá skin of this Swift in Sclater's collection.

303. *HEMIPROCNE ZONARIS* (Shaw); Scl. et Salv. Nomencl. p. 95.

*Chætura zonaris*, Scl. P. Z. S. 1865, p. 609.

Concordia, Retiro. (Mus. S.-G.)

Eggs (no. 114) elongated, white: axis 1·3, diam. ·87.

"Makes a nest of mud and moss in caves, or under the shelter of rocks, and lays two eggs."—*T. K. S.*

304. *CHÆTURA RUTILA* (Vieill.); Scl. P. Z. S. 1865, p. 613.

Retiro. (Mus. P. L. S.)

There is now no doubt about the occurrence of this Swift in Colombia. In Sclater's collection is a skin from Ecuador, received from Mr. G. N. Lawrence.

Fam. CAPRIMULGIDÆ.

305. *NYCTIBIUS JAMAICENSIS* (Gm.); Scl. P. Z. S. 1866, p. 129.

Concordia. (Mus. S.-G. and P. L. S.)

306. *CHORDEILES VIRGINIANUS* (Gm.); Scl. P. Z. S. 1866, p. 133.

One skin of the paler-coloured form of this species was in Mr. Salmon's fifth collection. (Mus. P. L. S.)

307. *ANTROSTOMUS CAROLINENSIS* (Gm.); Scl. P. Z. S. 1866, p. 136.

Medellin. (Mus. S.-G.)

A female of this species, not previously recorded south of Panama.

308. *STENOPSIS CAYENNENSIS* (Gm.); Scl. P. Z. S. 1866, p. 140.

In Mr. Salmon's fifth collection. (Mus. S.-G.)

309. *STENOPSIS RUFICERVIX*, Scl. P. Z. S. 1866, p. 140.

Envigado, Retiro, Sta. Elena. (Mus. S.-G.)

Iris dark.

Eggs (no. 112) white: axis 1·12, diam. ·85.

"The nest is on the ground, amongst ferns &c.

"The eggs vary very much both in size and colour; some are quite white, others pale red with small spots. At first I was inclined to think there were two species, as many of the birds differ considerably in appearance. I have never seen more than one egg in a nest."—*T. K. S.*

310. *HYDROPSALIS LYRA*, Bp.; *Scl. P. Z. S.* 1866, p. 143.  
Envigado. (Mus. S.-G.)

311. *HYDROPSALIS SEGMENTATA*, Cassin; *Scl. P. Z. S.* 1866,  
p. 143.  
In Mr. Salmon's fifth collection. (Mus. S.-G.)

312. *NYCTIDROMUS ALBICOLLIS* (Gm.); *Scl. P. Z. S.* 1866,  
p. 144.  
Concordia, Remedios, Medellin.  
Iris dark.

313. *STEATORNIS CARIPENSIS*, Humboldt.  
Sta. Elena. (Mus. S.-G.)  
Mr. Salmon told us that he bought this specimen alive from an Indian in the village of Sta. Elena.

#### Fam. PICIDÆ.

314. *PICUMNUS OLIVACEUS* (Lafr.); *Salvin, P. Z. S.* 1870,  
p. 212; et *Ibis*, 1874, p. 323.  
Medellin. (Mus. S.-G.)

315. *CAMPEPHILUS MALHERBII*, Gray & Mitch.; *Scl. Cat. A.*  
B. p. 311.  
Cauca, Concordia, Remedios. (Mus. S.-G.)

316. *CAMPEPHILUS POLLENS* (Bp.).  
*Picus pollens*, Bp. *Atti Soc. It.* vi. p. 406 (1845).  
*Megapicus grayii*, Malh. (1849).  
*Campephilus grayii*, *Scl. Cat.* p. 331.  
Sta. Elena, Frontino. (Mus. S.-G.)  
Iris dark.

317. *CAMPEPHILUS HÆMATOGASTER* (Tsch.); *Scl. Cat. A. B.*  
p. 332.  
Sta. Elena, Remedios. (Mus. P. L. S.)  
Iris yellow.

318. *DRYOCOPUS LINEATUS* (Linn.); *Scl. Cat. A. B.* p. 332.  
Sta. Elena. (Mus. S.-G. and P. L. S.)  
*D. fuscipennis*, Sclater, of Ecuador, merely differs in its brownish wings, and is, we now think, inseparable. In Mr. Salmon's skins the wings are quite as black as in eastern specimens.

319. *CHLORONERPES FUMIGATUS* (d'Orb.); *Scl. Cat. A. B.* p. 337.

Frontino. (Mus. S.-G.)

320. *CHLORONERPES CECILÆ* (Malh.); *Scl. Cat. A. B.* p. 338.

Antioquia, Remedios, Neche. (Mus. S.-G. and P. L. S.)

Iris dark.

321. *CHLORONERPES DIGNUS*, *Scl. et Salv. P. Z. S.* 1877, p. 20, pl. i.

Jerico. (Mus. P. L. S.)

322. *CHLORONERPES XANTHOCHLORUS*, *Scl. et Salv. P. Z. S.* 1875, p. 238.

Remedios. (Mus. S.-G.)

A female of this rare species, agreeing with the type from Venezuela in Mus. P. L. S.

323. *CHLORONERPES RUBIGINOSUS* (Sw.).

*Chloronerpes rubiginosus* et *C. canipileus*, *Scl. Cat. A. B.* p. 339.

Retiro, Concordia, Sta. Elena.

Iris dark.

After examining a series of these two supposed species from Venezuela, Colombia, Ecuador, and Peru, including a specimen that has been compared with d'Orbigny's type of *Picus canipileus*, we have come to the conclusion that there are no grounds for maintaining their distinctness.

324. *CHRYSOPTILUS PUNCTIGULARIS* (Bodd.); *Scl. Cat. A. B.* p. 340.

Remedios.

Iris dark.

325. *MELANERPES PULCHER*, *Scl. P. Z. S.* 1870, p. 330; *Wyatt, Ibis*, 1871, p. 380.

Remedios. (Mus. S.-G.)

Iris dark. Stomach contained insects.

326. *MELANERPES FLAVIGULARIS* (Malh.); *Scl. Cat. A. B.* p. 341.

Retiro, Concordia, Sta. Elena. (Mus. S.-G. and P. L. S.)

327. *HYPOXANTHUS RIVOLII* (Boiss.).

*Colaptes rivolii*, *Scl. Cat. A. B.* p. 344.

Retiro, Sta. Elena. (Mus. S.-G.)

Iris dark.

Egg (no. 119) glossy white: axis 1.25, diam. .85.

328. *CELEUS LORICATUS* (Reich.).

*Meiglyptes loricatus*, *Reich. Handb.* p. 405 (1853), et *Icon. t. clxxi.* 4495, 6.

*Celeus mentalis*, Cassin (1860); Scl. et Salv. P. Z. S. 1864, p. 367.  
*Picus loricatus* et *P. pholidotus*, Sund. Pic. p. 87.

"Remedios and Neche."

"Iris dark."

The male from Neche agrees with Cassin's plate (Journ. Phil. Ac. v., pl. 52. figs. 1, 2), and shows the red throat. It appears, however, that Reichenbach's name is the oldest for this species, which ranges from Panama to Guayaquil.

#### Fam. MOMOTIDÆ.

329. *MOMOTUS ÆQUATORIALIS*, Gould, P. Z. S. 1857, p. 233.

Envigado, Retiro, Concordia, Frontino. (Mus. P. L. S. and S.-G.)  
 Iris red.

Eggs (no. 135) glossy white: axis 1.55, diam. 1.22.

Mr. Salmon's skins are of the large western form described by Mr. Gould on specimens from Ecuador.

"The nest of this bird is rather curious; it is made by the bird burrowing in a sandbank for about three feet, and then forming a chamber about eighteen inches in diameter, where the eggs are deposited on the sand."—*T. K. S.*

330. *UROSPATHA MARTII* (Spix); Salv. Att. Ac. Sc. Torino, iv. p. 180 (1868); Scl. et Salv. Nomencl. p. 102.

Remedios, Neche. (Mus. S.-G.)

Iris dark. Beetles in stomach.

331. *PRIONIRHYNCHUS PLATYRHYNCHUS* (Leadb.); Scl. P. Z. S. 1857, p. 256.

Remedios. (Mus. S.-G. and P. L. S.)

#### Fam. ALCEDINIDÆ.

332. *CERYLE TORQUATA* (Linn.); Sharpe, Kingf. pl. xxii.

Neche.

Iris dark.

333. *CERYLE AMAZONA* (Lath.); Sharpe, Kingf. pl. xxiv.

Neche.

334. *CERYLE CABANISI* (Tsch.); Sharpe, Kingf. pl. xxv.

Retiro, Concordia, Medellin.

#### Fam. TROGONIDÆ.

335. *TROGON COLLARIS*, Vieill.; Gould, Mon. Trog. ed. ii. pl. xiii.

Concordia, Frontino, Sta. Elena. (Mus. S.-G.)

Iris dark.

Eggs (no 116) white: axis 1.1, diam. .9.

"Lays two eggs in a hole of a tree."—*T. K. S.*



336. *TROGON ATRICOLLIS* (Vieill.) ; Gould, Mon. Trog. ed. ii. pl. xiv.

Remedios, Neche. (Mus. S.-G.)

337. *TROGON MERIDIONALIS*, Sw. ; Gould, Mon. Trog. ed. ii. pl. xvii.

Remedios. (Mus. S.-G. and P. L. S.)

Iris dark. Stomach contained fruit.

338. *TROGON CHIONURUS*, ScL. et Salv. ; Gould, Mon. Trog. ed. ii. pl. xxii.

Remedios, Neche. (Mus. P. L. S. and S.-G.)

Iris dark.

Eggs (no. 157) white: axis 1.13, diam. .95.

"Builds in the holes of palm trees, and lays two white eggs."—*T.K.S.*

339. *TROGON MACRURUS*, Gould, Mon. Trog. ed. ii. pl. xxx.

Remedios, Neche. (Mus. S.-G. and P. L. S.)

Iris dark. Stomach contained fruit.

340. *PHAROMACRUS FULGIDUS* (Gould) ; Gould, Mon. Trog. ed. ii. pl. iii.

Concordia, Sta. Elena. (Mus. S.-G.)

Iris dark. Stomach contained fruit.

341. *PHAROMACRUS AURICEPS* (Gould) ; Mon. Trog. ed. ii. pl. iv.

Concordia, Frontino, Sta. Elena. (Mus. P. L. S. and S.-G.)

Iris dark. Stomach contained fruit.

Eggs (no. 127) greenish blue: axis 1.45, diam. 1.17.

"Lays two eggs in holes in trees, making no nest."—*T. K. S.*

#### Fam. GALBULIDÆ.

342. *GALBULA RUFICAUDA*, Cuv. ; ScL. Cat. A. B. p. 266.

Frontino. (Mus. S.-G.)

343. *BRACHYGALBA SALMONI*, sp. nov.

*Æneo-viridis, pilei plumis fusco adumbratis, gutture et remigibus intus ad basin albis, ventre medio et crisso castaneis; rostro nigro; pedibus fuscis. Long. tot. 7.2, alæ 2.8, caudæ 2.3, rostri a rictu 1.8.*

*Hab.* Neche in Statu Antioquiæ, reipubl. Columbianæ (*Salmon*).

*Mus.* P. L. S. et S.-G.

*Obs.* Sp. a *B. goeringi*, cui affinis, pileo dorso concolori nec fusco distinguenda.

Mr. Salmon obtained on the Neche two examples of what appears to be a new species of the black-billed section of *Brachygalba*. They are marked ♂ and ♀ ; but both are immature. The male would, no doubt, have the middle of the belly white as in *B. goeringi*, nobis<sup>1</sup>, from which the new species may be at once distinguished by its

<sup>1</sup> P. Z. S. 1869, p. 243, pl. xviii.

uniform colour above, the feathers of the front and vertex being merely slightly edged with brown.

The tail is nearly square as in other *Brachygalba*; the bill is quite black.

344. *JACAMEROPS GRANDIS* (Gm.); *Scl. Cat. A. B.* p. 268.

Remedios.

Iris dark.

Fam. *BUCCONIDÆ*.

345. *BUCCO PECTORALIS*, G. R. Gray, *Gen. B.* pl. 26; *Scl. Syn. Bucc.* p. 8.

Nече.

A species hitherto only known from Panama.

346. *BUCCO SUBTECTUS*, *Scl. Cat. A. B.* p. 270.

Nече.

347. *BUCCO RADIATUS*, *Scl. Cat. A. B.* p. 271.

Remedios, Nече. (Mus. S.-G. and P. L. S.)

The type specimen of this species (Mus. P. L. S.) is rather whiter below; but a Bogotá skin exactly agreeing with Mr. Salmon's specimens is in Sclater's collection.

348. *MALACOPTILA CASTANEA*, Verreaux, *Rev. de Zool.* xviii. p. 355, pl. xix. (1866).

Frontino. (Mus. S.-G. and P. L. S.)

Mr. Salmon's skins of this fine species agree with others from Ecuador. The type is said to have been received from Bogotá.

349. *MALACOPTILA PANAMENSIS*, Lafr.; *Scl. et Salv. P. Z. S.* 1870, p. 201.

Remedios. (Mus. P. L. S.)

Mr. Salmon's skins cannot be distinguished from Central-American specimens.

350. *MONASA PALLESCENS*, Cassin, *Pr. Ac. Phil.* 1860, p. 134, et 1864, p. 287, t. iv.; *Scl. et Salv. Ibis*, 1871, p. 374.

Remedios, Nече. (Mus. S.-G. and P. L. S.)

Iris dark. Stomach contained lizards &c.

Fam. *CUCULIDÆ*.

351. *CROTOPHAGA ANI* (Linn.); *Scl. Cat. A. B.* p. 320.

Retiro, Medellin.

Iris dark.

"The nest is simply a mass of sticks with a side entrance. It is generally reported by the natives that several birds lay their eggs in the same nest."—*T. K. S.*

352. *CROTOPHAGA MAJOR*, Linn.; *Scl. Cat. A. B.* p. 320.

Nече.

353. *DIPLOPTERUS NÆVIUS* (Linn.); Sclater, Cat. A. B. p. 321.  
Concordia, Medellin.

354. *PIAYA CAYANA* (Linn); Scl. Cat. A. B. p. 321.  
Envigado. (Mus. S.-G. and P. L. S.)

355. *PIAYA MINUTA* (Vieill.); Scl. Cat. A. B. p. 322.  
Medellin.  
Iris red. Stomach contained insects.

356. *COCYZUS AMERICANUS* (Linn.).  
Medellin. (Mus. S.-G. and P. L. S.)  
Iris dark.

357. *COCYZUS ERYTHROPHthalmus* (Wils.).  
Medellin. (Mus. S.-G. and P. L. S.)

#### FAM. RAMPHASTIDÆ.

358. *RAMPHASTOS TOCARD*, Vieill. ; Gould, Mon. ed. ii. pl. iv.  
Concordia, Medellin, Remedios.  
Iris red.

359. *RAMPHASTOS CITREOLEMUS*, Gould ; Mon. ed. ii. pl. ix.  
Medellin, Remedios. (Mus. S.-G.)  
Iris blue.

360. *PTEROGLOSSUS TORQUATUS* (Wagl.) ; Gould, Mon. ed. ii.  
pl. xx.  
Remedios. (Mus. P. L. S.)  
Iris yellow.

361. *ANDIGENA SPILORHYNCHUS*, Gould, P. Z. S. 1858, p. 149.  
Frontino, Concordia, Remedios. (Mus. S.-G. and P. L. S.)  
Iris dark red.  
This bird comes very near to *A. nigrirostris*, but may perhaps remain distinct.

362. *AULACORHAMPHUS HEMATOPYGIUS*, Gould, Mon. ed. ii.  
pl. xlv.  
Concordia, Remedios. (Mus. S.-G. and P. L. S.)  
Iris red.

363. *AULACORHAMPHUS ALBIVITTA* (Boiss.) ; Gould, Mon. ed. ii.  
pl. xlix.  
Envigado, Pocune, Concordia. (Mus. S.-G. and P. L. S.)

#### FAM. CAPITONIDÆ.

364. *CAPITO MACULICORONATUS*, Lawr. ; Marshall, Mon. Barb.  
pl. lxi.  
Remedios, Neche. (Mus. S.-G. and P. L. S.)  
Iris dark.  
Previously only known from Panama.

365. *CAPITO BOURCIERI* (Lafr.); Marshall, Mon. Barb. pl. lxvi.  
Frontino.  
Iris dark. Stomach contained fruit.

## Fam. PSITTACIDÆ.

366. *ARA MILITARIS* (Linn.).

*Sittace militaris*, Finsch, Papag. i. p. 396.  
In Mr. Salmon's fifth collection.

367. *ARA SEVERA* (Linn.)

*Sittace severa*, Finsch, Papag. i. p. 417.  
Cauca.

368. *CONURUS WAGLERI*, Gray; Finsch, Papag. i. p. 459.  
Medellin. (Mus. S.-G. and P. L. S.)

369. *BROTOGERYS TOVI* (Gm.); Finsch, Papag. ii. p. 99.  
Remedios.  
Iris dark. Stomach contained fruit.

370. *CHRYSOTIS DIADEMATA*, Spix; Finsch, Papag. ii. p. 545.  
Remedios.

371. *CHRYSOTIS FARINOSA* (Bodd.); Finsch, Papag. ii. p. 565.  
Remedios.

372. *CHRYSOTIS MERCENARIA* (Tch.); Finsch, Papag. ii. p. 594.  
Concordia.

373. *PIONUS MENSTRUUS* (Linn.).

*Pionias menstruus*, Finsch, Papag. ii. p. 441  
Remedios.

"Builds in the holes of decayed palm trees, and lays four white eggs."—T. K. S.

374. *PIONUS CHALCOPTERUS* (Fraser).

*Pionias chalconotus*, Finsch, Papag. ii. p. 462.  
Envigado, Concordia. (Mus. S.-G.)

375. *CAICA PYRILIA* (Bp.); Wyatt, Ibis, 1871, p. 381.

*Pionias pyrilia*, Finsch, Papag. ii. p. 419.  
Remedios. (Mus. P. L. S.)  
Iris dark; stomach contained fruit.

## STRIGES.

376. *STRIX FLAMMEA* (Linn.).

Medellin.

377. *SYRNIUM HYLOPHILUM* (Temm.).

Rio Negro, Sta. Elena. (Mus. S.-G.)

378. *SCOPS BRASILIANUS* (Gm.).

Envigado, Concordia, Medellin, Sta. Elena. (Mus. S.-G.)

Iris yellow.

Eggs (no. 127) white: axis 1.4, diam. 1.2.

"Builds, or rather lays its eggs, in a variety of places. I have seen them under the eaves of houses, as well as in the holes of trees, old walls, and buildings, but have never seen the slightest appearance of nest. Its food consists chiefly of beetles; but it undoubtedly also feeds on other things, as I have seen in the nest, when it had young, remains of frogs. In a nest where there were two young about half-grown, the female having been killed, the male still continued to feed the young, and, on their attaining the proper size, undertook to teach them to fly. In the short twilight they would crawl to the mouth of the hole, where he seized them with (I could not see clearly) either beak or claws, and let them drop. This of course naturally made them spread their wings and come to the ground, when he again caught them up, lifting them some height, and dropped them again, when the effort was much more successful. The experiment was repeated several times with great success; but I could not see the finish, on account of the darkness."—*T. K. S.*

379. *PULSATRIX TORQUATA* (Daud.).

Cauca.

380. *CICCABA VIRGATA* (Cassin).

Concordia. (Mus. S.-G.)

381. *CICCABA ALBOGULARIS* (Cassin).

Rio Negro, Sta. Elena. (Mus. S.-G.)

Iris orange.

Eggs (no. 132) white: axis 1.55, diam. 1.35.

"I have invariably seen the nest on the ground amongst ferns or grass, with the exception of one; and in that case the egg was placed in the deserted nest of a small bird called here the 'sparrow.' The nest was built in a bush at some distance from the ground. The bird was sitting at the time; and the egg nearly filled the inside of the nest. This Owl seems to feed almost exclusively on beetles."—*T. K. S.*

382. *GLAUCIDIUM JARDINII*, Bp.; Ridgway, Ibis, 1876, p. 4, pl. i.

Sta. Elena. (Mus. S.-G.)

## ACCIPITRES.

383. *CIRCUS HUDSONICUS* (Linn.).

Medellin. (Mus. S.-G.)

384. *ASTURINA MAGNIROSTRIS* (Gm.); Scl. and Salv. Ex. Orn. p. 180.

Retiro, Concordia, Sta. Elena, Medellin, Remedios. (Mus. S.-G.)  
Iris yellow.

Egg (no. 127) pinkish white, thickly blotched with red-brown and lilac spots at the larger or smaller end; in some specimens the whole egg is freckled with reddish spots, the larger blotches being paler: axis 1·85, diam. 1·5.

"Builds a rather loosely made though massive nest in willow or poplar trees: it is usually lined with green willow-leaves. I have never seen more than one egg in a nest."—*T. K. S.*

385. *ASTURINA LEUCORRHOEA* (Quoy et Gaim.); Scl. et Salv. Ex. Orn. p. 180.

Concordia, Sta. Elena. (Mus. S.-G.)  
Iris yellow.

386. *BUTEOLA BRACHYURA* (Vieill.).  
Sta. Elena.

387. *BUTEO SWAINSONI*, Bp.; Ridgw. B. of N. Am. iii. p. 263.  
One adult example in the eighth collection. (Mus. S.-G.)

388. *BUTEO PENNSYLVANICUS* (Wils).  
Concordia, Envigado, Sta. Elena. (Mus. S.-G.)

389. *BUTEO HYPOSPODIUS*, Gurney, Ibis, 1876, p. 73, pl. iii.  
Medellin. (Mus. S.-G.)

390. *BUTEO ALBICAUDATUS*, Vieill.  
Sta. Elena and Rio Negro. (Mus. S.-G.)

391. *LEUCOPTERNIS SEMIPLUMBEA* (Lawr.); Scl. et Salv. Ex. Orn. p. 121, pl. 61; Salv. Ibis, 187, p.  
Remedios. (Mus. S.-G.)

392. *GERANOÆTUS MELANOLEUCUS* (Vieill.).  
In Mr. Salmon's third collection. (Mus. S.-G.)

393. *SPIZAËTUS ORNATUS* (Daud.).  
Remedios. (Mus. S.-G.)  
Iris dark.

394. *SPIZAËTUS ISIDORII* (Des Murs).  
In Mr. Salmon's third collection. (Mus. S.-G.)

395. *ACCIPITER BICOLOR* (Vieill.); Scl. et Salv. Ex. Orn. p. 137, pl. 69.  
Remedios. (Mus. S.-G.)

396. *ACCIPITER VENTRALIS*, Scl.; Scl. et Salv. Ex. Orn. p. 25.  
pl. 13.

Retiro, Concordia, Medellin, Remedios. (Mus. S.-G.)  
Iris yellow.

397. *ACCIPITER TINUS* (Lath.).

Remedios. (Mus. S.-G.)  
Iris yellow.

398. *HYPOTRIORCHIS COLUMBARIUS* (Linn.).

Medellin. (Mus. S.-G.)

399. *HYPOTRIORCHIS RUFIGULARIS* (Daud.).

Nече.

400. *TINNUNCULUS SPARVERIUS* (Linn.).

Envigado, Concordia, Medellin, Sta. Elena. (Mus. S.-G.)

Eggs (no. 131) pale red, thickly mottled with a darker shade:  
axis 1.42, diam. 1.1.

"Builds on old buildings or holes of trees, laying four eggs."—  
T. K. S.

401. *ELANOIDES FURCATUS* (Linn.)

Concordia, Neche. (Mus. S.-G.)  
Iris dark.

402. *ROSTRHAMUS SOCIABILIS* (Vieill.); Gurney, Ibis, 1879,  
p. 341.

Remedios.  
Iris red.

403. *ROSTRHAMUS HAMATUS*, Temm.; Gurney, Ibis, 1879,  
p. 340.

Remedios. (Mus. S.-G.)

404. *CYMINDIS UNCINATUS* (Temm.).

Medellin. (Mus. S.-G.)

405. *ICTINIA PLUMBEA* (Vieill.).

Concordia, Remedios. (Mus. S.-G.)  
Iris red. Insects in stomach.

406. *HERPETOTHERES CACHINNANS*, Vieill.

Cauca, Remedios.  
Iris dark.

407. *IBYCTER AMERICANUS* (Bodd.).

Medellin, Remedios, Neche.

408. *MILVAGO CHIMACHIMA* (Vieill.).

Cauca. (Mus. S.-G.)

409. *POLYBORUS CHERIWAY* (Jacquin.); Sharpe, Cat. i. p. 33.

Rio Negro. (Mus. S.-G.)

Eggs (no. 144) thickly freckled with red spots, and blotched at the larger or smaller end with patches of several darker shades of the same colour: axis 2·3, diam. 1·83.

"The only nest I obtained was made of a mass of sticks, and placed in a large tree about 50 feet from the ground."—*T. K. S.*

"Builds under an overhanging stone among the rocks, and lays two white eggs, very thickly spotted. It may choose other situations, as I have only known one nest."—*T. K. S.*

410. *CATHARTES AURA* (Linn.).

In the seventh collection.

Eggs creamy-white, spotted with evenly distributed small spots of several shades of red-brown: axis 2·75, diam. 1·9. (Mus. Brit.)

411. *CATHARTES ATRATUS* (Bartr.).

Eggs (no. 141) white, sparingly marked with rather large spots of several shades of red-brown and lilac: axis 3·95, diam. 2.

"Builds a nest of a few sticks on the ground or under shelter of rocks."—*T. K. S.*

412. *GYPAGUS PAPA* (Linn.).

Several specimens.

### STEGANOPODES.

413. *PLOTUS ANHINGA*, Linn.

### HERODIONES.

414. *ARDEA CANDIDISSIMA* (Gm.).

Cauca.

415. *BUTORIDES VIRESCENS* (Linn.).

Medellin. (Mus. S.-G.)

416. *BUTORIDES CYANURUS* (Vieill.).

Remedios, Medellin. (Mus. S.-G.)

Iris yellow.

Egg (no. 109) pale greenish white: axis 1·4, diam. 1·1. (Mus. S.-G.)

417. *TIGRISOMA SALMONI*, Scl. et Salv. P. Z. S. 1875, p. 38.

Cauca and Medellin. (Mus. S.-G.)

418. *NYCTICORAX GARDENI* (Gm.).

Medellin. (Mus. S.-G.)

419. *CANCROMA COCHLEARIA*, Linn.

Remedios.

Iris yellow.



420. *HARPIPRION CAYENNENSIS* (Gm.).

Nече.

Iris dark.

## ANSERES.

421. *QUERQUEDULA DISCORS* (Linn.); *Scl. & Salv. P. Z. S.* 1876, p. 383.

Medellin. (Mus. S.-G.)

This is the first time we have met with this species south of the Isthmus of Panama.

422. *SPATULA CLYPEATA* (Linn.); *Scl. & Salv. P. Z. S.* 1876, p. 396.

Medellin. (Mus. S.-G.)

Not previously noticed south of Guatemala.

423. *MERGANETTA LEUCOGENYS* (Tsch.); *Scl. & Salv. P. Z. S.* 1876, p. 408.

Frontino. (Mus. S.-G.)

## COLUMBÆ.

424. *COLUMBA SPECIOSA*, Gm.

Remedios. (Mus. S.-G.)

"Iris red."

The egg (no. 124) is creamy white: axis 1.45, diam. 1.02.

"The nest, made of small sticks, is placed in high underwood."—

—*T. K. S.*425. *COLUMBA ALBILINEATA*, G. R. Gray.

Retiro. (Mus. S.-G.)

"Makes a nest of sticks and twigs in high underwood in forest."

—*T. K. S.*426. *COLUMBA RUFINA* (Temm.).

Medellin.

Iris red.

427. *COLUMBA VINACEA* (Temm.).

Remedios. (Mus. S.-G.)

Food, fruit.

428. *COLUMBA SUBVINACEA*, Lawrence; *Ann. Lye. N. Y.* ix. p. 135 (1868).

Remedios. (Mus. S.-G.)

Food, fruit.

429. *ZENAIDA RUFICAUDA*, Bp.

Retiro, Medellin, Remedios. (Mus. S.-G.)

Egg (no. 118) creamy white: axis 1.18, diam. .9.

"The nest is made of small sticks and twigs and placed in low bushes."—*T. K. S.*

430. *CHAMÆPELIA RUFIPENNIS*, Bp.

Medellin.

Iris yellow. Seeds in stomach. Nests in low bushes.

"The nest is composed of small twigs, grass, and leaves, and is placed on the outside of low bushes."—*T. K. S.*

431. *PERISTERA CINEREA* (Temm.).

Remedios.

Iris dark. Seeds in stomach.

"The nest is made of small twigs, and is exceedingly small and slight; it is placed on the outside boughs of low bushes."—*T. K. S.*

432. *LEPTOPTILA VERREAUXI*, Bp.

Retiro, Medellin.

Iris dark.

"The nest is made of sticks and twigs, and placed in underwood not very high."—*T. K. S.*

433. *GEOTRYGON LINEARIS* (Knip et Prév.).

Sta. Elena. (Mus. S.-G.).

Iris yellow. Berries in stomach.

## GALLINÆ.

434. *PENELOPE CRISTATA* (Linn.); Scl. & Salv. P. Z. S. 1870, p. 525.

Remedios.

435. *ABURRIA CARUNCULATA*, Reich.; Scl. & Salv. P. Z. S. 1870, p. 530.

Cauca, Frontino. (Mus. Brit.)

Eggs (no. 143) dirty white, texture rather smoother than usual in Cracidae: axis 2·8, diam. 2·0.

436. *CHAMÆPETES GOUDOTI* (Lesson); Scl. & Salv. P. Z. S. 1870, p. 531.

Retiro. (Mus. Brit.)

Eggs (no. 142) creamy white; texture rough: axis 3·8, diam. 2.

437. *ORTALIDA GUTTATA* (Spix); Scl. & Salv. P. Z. S. 1876, p. 536.

Concordia, Sta. Elena. (Mus. S.-G.)

Iris red. Stomach contained fruit.

438. *EUPSYCHORTYX LEUCOTIS*, Gould.

Medellin. (Mus. S.-G.)

Egg (no. 106) pale buff-white, spotted with large blotches of tawny; in some specimens freckled with small spots of this colour: axis 1·35, diam. 1.

## 439. ODONTOPHORUS MARMORATUS, Gould.

Remedios. (Mus. S.-G.)

Iris dark red.

Egg (no. 153) white: axis 1.5, diam. 1.1.

"Builds its nest into a bank or side of the ground in the high forest, with a tunnel-like entrance made of interlaced twigs and sticks—or, perhaps more properly speaking, with a neatly executed bow in front of the nest, which is merely a hole scraped in the ground and lined with dead leaves.

"When wandering one morning in the forest, I saw a pair engaged in the work of nest-making. The male was in the nest; and the female appeared to be building around him. The female made off on my approach; but the male continued in the nest until I nearly put my hand on him, no doubt trusting to his dark colour amongst the dead leaves to escape detection. I do not think I should have seen him, had it not been for the scarlet over the eye."—T. K. S.

## 440. ODONTOPHORUS HYPERYTHRUS, Gould.

*Odontophorus hyperythrus*, Gould, P. Z. S. 1857, p. 223 (♂)*Odontophorus hypospodius*, ScL. & Salv. Nomencl. p. 162 (1873), ♀.

Sta. Elena. (Mus. S.-G.)

Iris dark. Berries in stomach.

Additional specimens received from Mr. Salmon show that our *O. hypospodius*, based upon a specimen in one of his earlier collections, is simply the female of Mr. Gould's *O. hyperythrus*. One example is in intermediate plumage, and, though marked as a female, is probably a young male.

## FULICARIÆ.

## 441. RALLUS NIGRICANS, Vieill.; ScL. &amp; Salv. P. Z. S. 1868, p. 446.

Medellin. (Mus. S.-G.)

Iris red.

"Builds a nest of aquatic grasses amongst high grass in damp places, and lays three stone-coloured eggs with a few small spots,"—T. K. S.

## 442. ARAMIDES CAYENNENSIS (Gm.); ScL. &amp; Salv. P. Z. S. 1868, p. 447.

Remedios. (Mus. S.-G.)

Iris red.

## 443. PORZANA CAROLINA (Linn.); ScL. &amp; Salv. P. Z. S. 1868, p. 450.

Medellin. (Mus. S.-G.)

## 444. PORZANA CAYENNENSIS (Gm.); ScL. &amp; Salv. P. Z. S. 1868, p. 451.

Remedios. (Mus. S.-G.)

Egg white; axis 1.35, diam. .98.

"The nest is round like a ball, made of coarse grass stalks, lined and covered with grass bents and blades, and has a side entrance. It is built 3 or 4 feet from the ground amongst the densest coarse herbage and shrubs, in wild open parts where the forest has been cut down. For ascending and descending it forms a kind of ladder with a platform in front of nest. Lays but two eggs, and is exceedingly shy."—*T. K. S.*

445. *POZZANA ALBIGULARIS* (Lawt.); *Scl. & Salv. P. Z. S.* 1868, p. 454.

Remedios. (Mus. S.-G.)

Iris dark.

Egg (no. 110) pale buff-white, sparsely spotted with small red spots: axis 1.1, diam. .9.

"The nest is made of grass stalks and bents, and is round, with a side entrance, and placed amongst high grass and bushes in low swampy places, about two feet above the ground or water."—*T. K. S.*

446. *PORPHYRIO MARTINICUS* (Linn.); *Scl. & Salv. P. Z. S.* 1868, p. 459.

Medellin. (Mus. S.-G.)

Iris red.

"Builds a nest of flags and grass amongst reeds by the water's edge."—*T. K. S.*

447. *GALLINULA GALEATA* (Licht.); *Scl. & Salv. P. Z. S.* 1868, p. 462.

Antioquia. (Mus. S.-G.)

"The nest is composed of flags and dried grasses, and is placed on low overhanging branches or amongst reeds."—*T. K. S.*

448. *HELIORNIS FULICA* (Bodd.); *Scl. & Salv. P. Z. S.* 1868, p. 469.

#### ALECTORIDES.

449. *EURYPYGA MAJOR*, Hartlaub.

Neehe.

Iris dark.

#### LIMICOLÆ.

450. *PARRA HYPOMELÆNA*, Gray.

Antioquia, Sta. Elena. (Mus. S.-G.)

Iris dark. Stomach contained insects.

Egg (no. 123) olive, thickly streaked with broad black lines, crossing one another in all directions: axis 1.2, diam. .9.

451. *VANELLUS CAYENNENSIS* (Gm.).

Retiro, Concordia, Frontino. (Mus. S.-G.)

Iris red.

Egg (no. 126) olive-brown, spotted with brownish-black spots of

various sizes and shades, especially near the larger end : axis 1·8, diam. 1·32.

"Makes no nest, but lays its four eggs in a depression in the ground."—*T. K. S.*

452. *CHARADRIUS VIRGINICUS*, Bechstein, Latham's Allg. Ueb. iv. pt. 2, p. 455 (1812).

Medellin. (Mus. S.-G.)

453. *ÆGIALITIS VOCIFERA* (Linn.).

Medellin. (Mus. S.-G.)

454. *GALLINAGO WILSONI* (Temm.).

Medellin. (Mus. S.-G.)

455. *GALLINAGO NOBILIS*, ScL.

Retiro. (Mus. S.-G.)

Eggs brownish-olive, spotted with several shades of dark brown, especially at the larger end : axis 1·8, diam. 1·3.

"The nest is placed on the ground in marshy places."—*T. K. S.*

456. *MACRORHAMPHUS GRISEUS* (Gm.).

Medellin. (Mus. S.-G.)

457. *TRINGA BAIRDI*, Coues.

Medellin. (Mus. S.-G.)

458. *GAMBETTA MELANOLEUCA* (Gm.).

Cauca, Medellin. (Mus. S.-G.)

459. *GAMBETTA FLAVIPES* (Gm.).

Medellin. (Mus. S.-G.)

460. *RHYACOPHILUS SOLITARIUS* (Wilson).

Medellin.

Iris dark. Insects in stomach.

461. *TRINGOIDES MACULARIUS* (Linn.).

Retiro.

462. *ACTITURUS LONGICAUDA* (Bechst.).

*Tringa longicauda*, Bechstein, Latham's Allg. Ueb. iv. pt. 2, p. 453, t. 42 (1812).

*Actiturus longicauda*, Dresser, B. of Europe.

*Actiturus bartramius*, ScL. et Salv. Nomencl. p. 146.

Medellin. (Mus. S.-G.)

463. *TRYNGITES RUFESCENS* (Vieill.).

Remedios. (Mus. S.-G.)

## PYGOPODES.

464. *TACHYBAPTUS DOMINICUS* (Linn.).

Antioquia. (Mus. S.-G.)

Iris yellow.

Egg (no. 125) dirty white: axis 1.2, diam. .9.

"The nest is placed by the water's edge."—*T. K. S.*

## CRYPTURI.

465. *TINAMUS RUFICEPS*, ScL. & Salv. Nomencl. p. 162.

Remedios. (Mus. S.-G. Egg Mus. Brit.)

Egg nearly round, Sèvres-blue: axis 2.2, diam. 1.9.

"No nest is formed, merely a depression amongst dead leaves on the ground at the foot of a large tree in the high forest. The bird does not appear to run from her nest on the approach of a person, but rises on the wing with a loud whirring noise, almost at your feet."—*T. K. S.*

466. *NOTHOCERCUS BONAPARTII* (Gray).

Concordia, Frontino. (Mus. S.-G.)

Iris dark. Stomach contained fruit.

Egg rather elongated, rich dark Sèvres-blue: axis 2.8, diam. 2.

"This Tinamou makes a nest of dead leaves on the ground at the foot of a tree; I have seen one on the top of a broken tree. It has the same habits as *Tinamus ruficeps*."—*T. K. S.*

467. *CRYPTURUS BOUCARDI*, Sclater.

Nèche. (Mus. S.-G.)

The single specimen is rather more rufous on the cheeks; but there is no difference sufficient to justify separation. The most southern locality hitherto known for this species is Costa Rica (*Car-miol*, in Mus. S.-G.).

468. *CRYPTURUS PILEATUS* (Bodd.).

Cauca. (Mus. S.-G.)

Egg (no. 128) uniform pale chocolate: axis 1.3, diam. 1.23.

"Builds a nest of dead leaves on the ground, and lays two eggs."—*T. K. S.*

"Strictly speaking this nest has no materials, as it is simply a depression on the ground amongst dead leaves."—*T. K. S.*

## V. GENERAL CONCLUSIONS.

Mr. Salmon's collections, embracing examples of 468 species, although they do not certainly exhaust the rich avifauna of Antioquia, give us a sufficient basis for the deduction of a few conclusions respecting its general facies, which may be stated as follows:—

1. The avifauna of Antioquia is, on the whole, most nearly allied to that with which we have become acquainted from the

study of "Bogotá" collections. It must be recollected, however, that "Bogotá" collections contain a certain number of specimens from the southern slopes of the Columbian Andes and, therefore, strictly belonging to the Amazonian fauna.

2. In cases where the Bogotá species has a specifically distinct representative form in Ecuador, the Antioquian species generally belongs to the latter, or, at any rate, shows more resemblance to it; *e. g.* :—

BOGOTÁ.	ANTIOQUIA.	EQUADOR.
<i>Cinnicerthia unirufa.</i>	<i>C. unibrunnea</i> (?).	<i>C. unibrunnea.</i>
<i>Compsocoma victorini.</i>	<i>C. sumptuosa.</i>	<i>C. sumptuosa.</i>
<i>Ostinops sincipitalis.</i>	<i>O. atrocaneus.</i>	<i>O. atrocaneus.</i>
<i>Masius chrysoterpis.</i>	<i>M. coronulatus</i> (?)	<i>M. coronulatus.</i>
<i>Rupicola peruviana.</i>	<i>R. sanguinea.</i>	<i>R. sanguinea.</i>
<i>Cyananthus cyanurus.</i>	<i>C. mocoa.</i>	<i>C. mocoa.</i>
<i>Andigena nigrifrons.</i>	<i>A. spilothynchus.</i>	<i>A. spilothynchus.</i>

3. A certain number of Ecuadorian species, which do not occur in Bogotá collections, are found in Antioquia. Such are :—

<i>Cyphorhinus phaeocephalus.</i>	<i>Saltator atripennis.</i>
<i>Thryothorus nigricapillus.</i>	<i>Cnipodectes subbrunneus.</i>
<i>Diglossa brunneiventris.</i>	<i>Synallaxis erythrops.</i>
<i>Iridornis porphyrocephala.</i>	<i>Androdon aequatorialis.</i>
<i>Creurgops verticalis.</i>	<i>Phaethornis symmatophorus.</i>
<i>Tachyphonus delatrii.</i>	<i>Momotus aequatorialis.</i>
<i>Buarremon castaneiceps.</i>	

4. A certain number of species, hitherto only known from Panama or the adjacent districts, and not yet received from Bogotá, intrude from the north into the Antioquian avifauna. These are, for example :—

<i>Dacnis venusta.</i>	<i>Automolus pallidigularis.</i>
<i>Euphonia fulvica.</i>	<i>Dendrornis lacrimosa.</i>
<i>Calliste larvata.</i>	<i>Rhamphocœnus cinereiventris.</i>
— <i>icterocephala</i> <sup>1</sup> .	<i>Heliothrix barroti.</i>
<i>Pyrranga testacea.</i>	<i>Celeus loricatus</i> <sup>1</sup> .
<i>Orthogonys olivaceus.</i>	<i>Trogon chionurus.</i>
<i>Eucometis cassini.</i>	<i>Bucco subtectus</i> <sup>1</sup> .
<i>Ostinops guatemalensis.</i>	— <i>pectoralis.</i>
<i>Chromoceryle alcyon.</i>	<i>Monasa pallelescens.</i>
<i>Aulia rufescens.</i>	<i>Capito maculicoronatus.</i>
<i>Lipaugus holerythrus.</i>	<i>Leucopternis semiplumbea.</i>
<i>Lathra unirufa.</i>	<i>Crypturus boucardi.</i>

#### EXPLANATION OF THE PLATES.

##### PLATE XII.

*Cyphorhinus dichrous*, p. 492.

<sup>1</sup> These species also occur in Ecuador collections.

PLATE XLII.

- Fig. 1. Egg of *Diglossa personata*, p. 496.  
 2. " *Calliste virescens*, p. 498.  
 3. " *Rhamphocelus flammigerus*, p. 501.  
 4. " *Phanicothraupis gutturalis*, p. 502.  
 5. " *Tachyphonus melaleucus*, p. 503.  
 6. " *Chlorospingus flavipectus*, p. 503.  
 7. " *Buarremon eleophrus*, p. 504.  
 8. " *Psittospiza ricfferi*, p. 504.  
 9. " *Saltator albicollis*, p. 505.  
 10. " *Chromochloris viridis*, p. 517.  
 11. " — *manacus*, p. 517.  
 12. " *Hadrostomus homochrous*, p. 517.

PLATE XLIII.

- Fig. 1. } Eggs of *Ostinops atrocantans*, p. 509.  
 2. }  
 3. " *Ocyalus wagleri*, p. 508.  
 4. " *Hypopyrrhus pyrrhogaster*, p. 510.  
 5. " *Grallaria ruficeps*, p. 526.  
 6. " — *ruficapilla*, p. 527.  
 7. " *Pyroderus orinocensis*, p. 520.  
 8. " *Pipreola ricfferi*, p. 519.  
 9. " *Dysithamnus unicolor*, p. 525.

June 17, 1879.

Prof. W. H. Flower, F.R.S., President, in the Chair.

The Secretary made the following report on the additions to the Society's Menagerie during May 1879:—

The total number of registered additions to the Society's Menagerie during the month of May was 183, of which 16 were by birth, 46 by presentation, 104 by purchase, 4 were received in exchange, and 13 on deposit. The total number of departures during the same period, by death and removals, was 114.

The most noticeable additions during the month were:—

1. Two Horned Parrakeets (*Nymphicus cornutus*), purchased May 8th.

This Parrakeet is exceedingly rare, even in museums, and, so far as I know, has never been previously brought alive to Europe. The person from whom they were purchased obtained them in Sydney, where they were no doubt brought from New Caledonia, the only known habitat.

As will be seen from Mr. Smit's sketch of this beautiful bird, which I now exhibit (Pl. XLIV.), the figure in Gray and Mitchell's 'Genera of Birds' (plate ci.) is incorrect—the black colour on the face being wholly omitted, and the yellow on the back of the head barely shown.

2. An African Hornbill received in exchange May 8th, which appears to be a second example of the species described (P. Z. S. 1870, p. 668, plate xxxix.) as *Buceros subcylindricus*. Unfortunately



its tail is imperfect, so that I am at present unable to solve Mr. Elliot's doubts<sup>1</sup> as to the validity of the species.

3. A young male Patagonian Sea-lion (*Otaria jubata*), presented by F. E. Cobb, Esq., Manager of the Falkland-Islands Company, at Stanley, Falkland Islands, May 20th. This is a most acceptable present, as we have at present only two female *Otarie* in the Gardens, and these animals thrive and breed in captivity.

The new animal is believed to be about two years old, and was captured in the Falkland Islands in March last. At present he is considerably inferior in size to the two females, being not more than 4 feet in length.

4. A Saki Monkey (*Brachyurus*), purchased May 24th.

This Monkey we purchased as an example of *Brachyurus rubicundus*<sup>2</sup>, and probably belongs to that species, although it does not quite agree with the published descriptions and figures. An accurate examination of it can only be made after the death of the animal, when a further notice of this rare species shall be given.

Mr. Sclater exhibited a skin of *Ara glauca* (Vieill.) from Corrientes, belonging to M. Boucard's collection, and stated that, after comparing it with the bird in the Society's Gardens, purchased in June 1860, and named in the 'List of Vertebrates' (1877, p. 240) *Ara glauca*, he had come to the conclusion that the latter bird was certainly not an example of *Ara glauca*, but belonged to the allied form *Ara leari*<sup>3</sup>, readily distinguishable by its larger size and intense blue colouring, almost as fine a blue as in *Ara hyacinthina*.

The two species were well represented and distinguished in Souancé's 'Perroquets,' pl. i.

There were, therefore, four species of wholly blue Aras, namely:—

1. *Ara hyacinthina*, ex Amazonia inf.
2. *A. leari*, Bp., ex patr. ign.
3. *A. glauca* (Vieill.), ex Paraguaya.
4. *A. spixi*, ex Brasilia boreali.

Of all these, except *A. glauca*, the Society's collection now contains living examples.

Prof. Flower laid before the Meeting the skull of the female *Otaria* lately living in the Southport Aquarium (exhibited at the last meeting by Mr. Jackson), and stated that it belonged to the species originally described by Dr. McBain in the Proceedings of the Royal Physical Society of Edinburgh (vol. i. p. 422; meeting of Feb. 24th, 1858) as *Otaria gillespii*. The original specimen was obtained from California—as was the present example, and others now living in the Brighton Aquarium and in several menageries on the Continent. A fine skeleton of this species from Japan had long

<sup>1</sup> Monograph of the Hornbills, part i.

<sup>2</sup> See Casteln. Voy. Mamm. pl. iv. fig. 2, and Bates's Amazons (1864), p. 388.

<sup>3</sup> *Sittace leari*, Finsch, Papageien, i. p. 392.

been in the Leiden Museum, and had been figured by Schlegel in the 'Fauna Japonica' under the name of *O. stelleri*.

Mr. C. G. Danford exhibited and made some remarks on some remarkable antlers of Deer, which he had obtained during his recent journey in Asia Minor.

Hans, Graf von Berlepsch, C.M.Z.S., exhibited and made remarks on the skins of two varieties of the Long-tailed Titmouse (*Mecistura caudata*), which occurred near Cassel, in Germany, one of which appeared to be the same as the British form of this bird.

Dr. J. Murie read a paper on the Manatee (*Manatus americanus*), containing the results of his examination of the specimen which was lately living in the Westminster Aquarium. The peculiar attitudes assumed by the animal in life, the great mobility of the upper lip, and the occasional use of the limbs in feeding were noted. As regards the anatomy, the chief points dwelt on were the shape of the brain and its suppressed convolutions. The vexed question of the number of the cervical nerves and their distribution was also discussed.

This paper will be printed in the Society's 'Transactions.'

Mr. F. D. Godman exhibited and made remarks on a drawing of the Manatee by Mr. Wolf, taken from the specimen lately living in the Westminster Aquarium.

Prof. Newton, on behalf of Mr. Edward Newton, C.M.G., Corresponding Member, exhibited some bird-skins obtained by the latter in Jamaica, remarking:—

"Of the specimens on the table two belong to as many species which I believe have not before been recorded as occurring in Jamaica. One of them, the well-known *Dendroica virens*, has so wide a distribution that the only wonder is that it has not hitherto been met with there; but the other is of more interest. It is that which was originally described by Audubon (Orn. Biogr. ii. p. 563) under the name of *Sylvia swainsoni*, and was subsequently referred by the same author (B. Am. ii. p. 83) to a new genus, *Helinaia*, a word which Agassiz says should be written *Helonæa*. It is an extremely rare species; and I doubt whether a second example has ever been seen in this country. The present was killed by my brother at Hope, in the parish of St. Andrew, February 8th, 1879, and was found by him to be a male. I am indebted to the kindness of Mr. Ridgway, of the Smithsonian Institution, for the determination of this specimen of a species I never saw before. It is well figured in Audubon's great work.

"I have then to exhibit specimens of the rare *Dendroica pharetra*, first discovered by Mr. Gosse in Jamaica, to which island it is doubtless peculiar. These are of some interest as showing the nestling or at least immature stage of the plumage, which, as will be perceived, is of an olive-green and yellow instead of the black and white of the





1.



2.



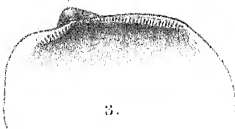
1.



3.



4.



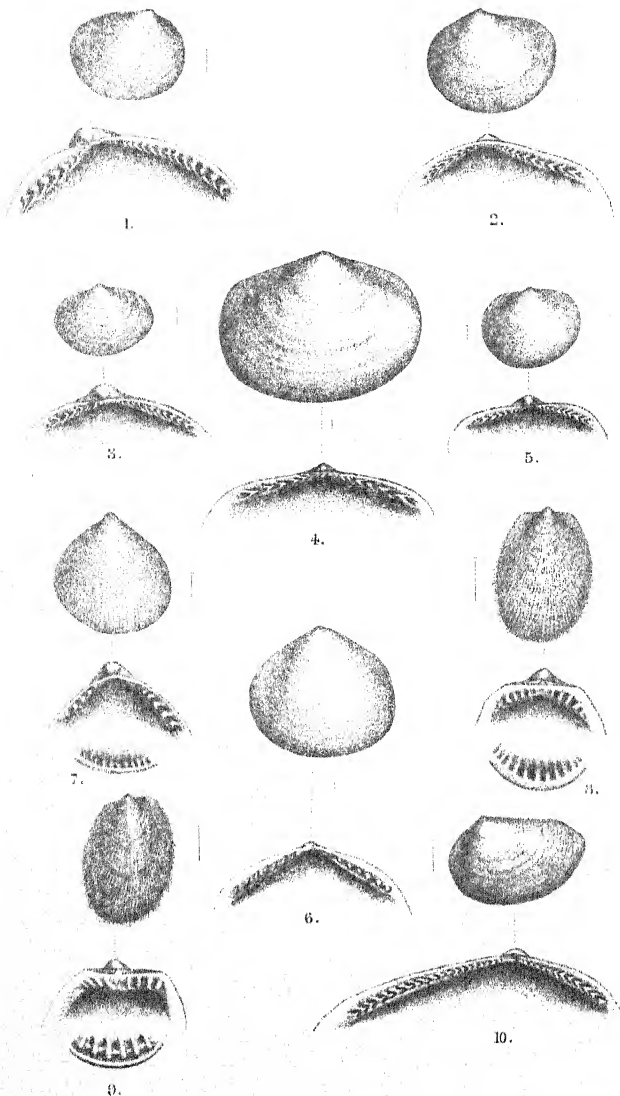
5.



6.







C. Bergeau lith.

MOLLUSCA OF THE LIGHTNING AND  
PORCUPINE EXPEDITIONS.

Minturn, Broc. imp.

adult. This fact, hitherto apparently unmentioned, naturally caused my brother and myself some embarrassment in naming these young birds: but at last we separately came to the conclusion that they were examples of this insular species; and our opinion has been fortified by the opinion of two such good authorities as Mr. Salvin and Mr. Ridgway, who have seen the specimens and given their judgment independently."

Prof. Garrod, F.R.S., read a paper on the brain and other parts of the Hippopotamus (*Hippopotamus amphibius*).

The author having had the opportunity of studying the brain of the adult male Hippopotamus presented to the Society by the late Viceroy of Egypt on May 25th, 1850, which died (apparently of old age) on March 11th, 1878, described it at some length, other accounts, by Gratiolet and Macalister, having been based upon the dissection of new-born individuals.

Basing his description upon the nomenclature adopted by Dr. Ureng in an important recent memoir on the brain in the Ungulata<sup>1</sup>, it was shown by the author that in the comparatively simple brain of the Hippopotamus, besides the great number of bridging convolutions laid so much stress on by Gratiolet, the middle gyrus of the outer surface of the cerebral hemisphere was peculiarly broad and bent by minor folds, at the same time that the fissura lateralis was continuous with the more anteriorly situated coronal fissure. The considerable differences between the brains of *Hippopotamus* and *Sus* were pointed out, as well as the characterizing features of the former.

The enormous stomach of the adult was stated to be 11 feet in length, at the same time that its position was different from that of most animals, its long axis corresponding with that of the body.

The particularly simple and transversely elongated liver, with its lengthy gall-bladder, was also described in detail.

This paper will be published entire in the Society's 'Transactions.'

The following papers were read:—

1. On the Mollusca procured during the 'Lightning' and 'Porcupine' Expeditions, 1868-70. (Part II.<sup>2</sup>) By J. GWYN JEFFREYS, LL.D., F.R.S., F.Z.S.

[Received June 5, 1879.]

(Plates XLV., XLVI.)

*Preliminary remarks.*

References will be given not only to the original authority for each species, but also to a figure in some recognized publication, in default

<sup>1</sup> Zeitsch. für wissenschaftl. Zoologie, Leipzig, 1878, pp. 297-344.

<sup>2</sup> For Part I. see P. Z. S. 1878, p. 393.

of which the plates which accompany this paper will supply the necessary illustrations. I consider it useless to add every synonym, a kind of work that serves no other purpose than to display the industry of the writer. For the same reason the authority for any locality mentioned in this paper is omitted, although I am prepared to name it. The position of each station, and the corresponding depth will be found in the introduction to the first part.

I prefer describing new species in my own language, instead of in dog-latin; and of course my continental friends are entitled to a similar privilege. The time has long passed since a knowledge of any of the principal languages of Europe was confined to its own country, when it was thought desirable to substitute Latin in scientific treatises. It should also be borne in mind that English is much more generally spoken and used than any other language in the civilized world. Latin cannot be applied with sufficient precision and intelligibility to the description of Natural-History specimens. For instance, we know next to nothing of the colours designated by classical names; yet conchologists do not hesitate to use such barbarous words as "griseus," "ochroleucus," "spadiceus," "aurantius," and "olivaceus," which appear in the works of Philippi and other authors of repute, but not in any good Latin dictionary.

The present work will form an additional supplement to 'British Conchology,' so far as regards our native Mollusca.

## CONCHIFERA.

### Family I. ANOMIIDÆ.

#### 1. ANOMIA EPHIPPIMUM, Linné.

*Anomia ephippium*, L. Syst. Nat. ed. xii. p. 1150: British Conchology, ii. p. 30, pl. i. f. 4; v. p. 165, pl. xx. f. 1.

'Lightning' Expedition: Stations 2, 3, 4, 5.

'Porcupine' Exp. 1869: St. 1, 3, 13, 14, 18, Loch Foyle, 39, 47, 70. 1870: Atlantic, 1, 2, 3, 6, 8, 9, 10, 12, Vigo Bay, 16, 17, 17a, 24, 26, 27, 28, 28a, 29, 30, 36; Mediterranean, 45, Capo de Gata, 50, Gulf of Bona, G. Tunis, Adventure Bank. Various shaped and sculptured. A specimen of the variety *aculeata* is partly smooth, and in that respect exactly like the young form or *squamula*; the variety *cylindrica* in Stations 1 of 1869 and 1870 was attached to the spines of *Cidaris papillata*. In some of the specimens the byssal orifice is unusually small.

*Distribution.* Type and varieties. Iceland to Egypt and Madeira, Labrador to Long Island Sound, 'Challenger' Exp. (coast of Brazil), Corea. Depths, low water to 1450 fathoms.

*Fossil.* Pliocene and Post-tertiary. Scandinavia, Great Britain and Ireland, Belgium, Vienna Basin, South of France, Italy, Morea, Rhodes, Nantucket I. Heights 0-460 feet.

Professor Verrill has lately separated the North-American form from ours under the specific name *glabra*; but I cannot detect any characteristic difference between them. This makes the 36th



synonym. The opinion that this mollusk is of a poisonous nature when eaten (B. C. ii. p. 32) has been confirmed by Dr. Hidalgo, who says that at Mahon it is called "ostia borda deveri" for that reason.

## 2. ANOMIA PATELLIFORMIS, Linné.

*Anomia patelliformis*, L. S. N. p. 1151 : B. C. ii. p. 34 ; v. p. 165, pl. xx. f. 2.

'Lightning' Exp. : off the Faroe I.

'Porcupine' Exp. 1869 : St. 2, 9, Galway B., 23a, The Minch. A specimen is marked like *Amussium hoskynsi* in an imbricated fashion. 1870 : Atl. 29, Tangier B. ; Med., Cartagena B.

*Distribution*. Faroe I. to Mediterranean and Adriatic, N. W. America ; 0-420 fms.

*Fossil*. Pliocene and Post-tertiary. Scandinavia, Great Britain and Ireland, Belgium, Vienna Basin, and Italy ; 4-130 ft.

Seventeen synonyms, including *Ostreum striatum* of Da Costa, and *A. striata* of Brocchi and Lovén.

## Family II. OSTREIDÆ.

### 1. OSTREA EDULIS, Linné.

*Ostrea edulis*, L. S. N. p. 1148 : B. C. ii. p. 38, pl. i. f. 5 ; v. p. 165, pl. xxi. f. 1.

'Porcupine' Exp. 1869 : St. 6, 9, Galway B. Valves of young shells, one being deeply concave, and resembling *O. cochlear*. 1870 : Atl. Cadiz ; Var. *parasitica*, Med., Capo de Gata and Cartagena B.

*Distribution*. Iceland to Mogador, Mediterranean and Adriatic, Sea of Azof, Nova Scotia and Newfoundland ; 0-45 fms.

*Fossil*. Pliocene and Post-tertiary. Scandinavia, Great Britain and Ireland, Holland, Belgium, Germany, Vienna Basin, S. France, Italy, Algeria, Turkey in Europe ; 0-1360 ft.

The synonyms are numerous, owing to the extreme variability of the shell.

### 2. OSTREA COCHLEAR, Poli.

*O. cochlear*, Poli, Test. utr. Sic. ii. p. 179, t. xxviii. f. 28.

'Porcupine' Exp. 1869 : St. 1, 35. 1870 : Atl. 10, 13, Setubal B., off Cape Sagres, 26, 36 ; Med. Cartagena B., 50, 50a, off Jijeli, 55, G. Bona, Benzert Road, Rasel Amoush, G. Tunis, and Adventure Bank. Some small and young specimens are intermediate between this species and *O. edulis* ; and I am by no means satisfied that the two are distinct. *O. cochlear* inhabits deeper and more still waters than *O. edulis* ; and it is attached to corals, shells, and other organisms, being often clustered together.

*Distribution*. Atlantic coasts of France and Lusitania, the Mediterranean, Adriatic, Ægean, and Canaries ; 40-205 fms. The depth at which it was affixed to the Cagliari-Bona submarine cable, and noticed by Professor Alphonse Milne-Edwards, is doubtful.

*Fossil*. Pliocene. Coralline Crag (as *O. spectrum*), Belgium, Vienna Basin, Biot, Italy, Algeria, and Morea.

## Family III. SPONDYLIDÆ.

SPONDYLUS GUSSONI, O. G. Costa.

*S. gussonii*, O. G. Costa, Cat. Sist. p. xlii: Philippi, Moll. Sic. i. p. 87, t. v. f. 16.

'Porcupine' Exp. 1870: Atl. St. 16, 24, 25; Med. 45, Capo de Gata, 58.

*Distribution*. Mediterranean, Adriatic, and Ægean; 40-120 fms.*Fossil*. Pliocene. Metz, Biot, Sicily.*S. gæderopus* did not occur; and it will be seen that many other equally common shells were not procured during any of these Expeditions.

## Family IV. PECTINIDÆ.

## 1. PECTEN PUSIO, Linné.

*Ostrea pusio*, L. S. N. 1146.*P. pusio*, B. C. ii. p. 51; v. p. 166, pl. xxii. f. 1.

'Lightning' Exp.: St. 4.

'Porcupine' Exp. 1869: 2. 1870: Atl. Vigo B., 36 (*Hinnites* form), Tangier B.; Med. Capo de Gata, 55.*Distribution*. Faroe Isles to Morocco and the Mediterranean, Adriatic, Ægean, Madeira, Canaries, Azores, and S. Africa; 0-180 fms.*Fossil*. Pliocene and Post-tertiary. Scandinavia, Great Britain and Ireland, Belgium, Transylvania, S. France, Algiers, Italy, and Rhodes; 0-130 ft.Several synonyms, including *P. distortus* of Da Costa and *P. multistriatus* of Poli.

I have here endeavoured, as on former occasions, to arrange the species in their natural sequence, so as to show their relative affinity.

In the 'Porcupine' Expedition of 1870, I dredged at Station 9 (509 fms.) a fragment of a *Pecten*, apparently allied to *P. pusio*, but representing a shell about an inch and a half in length, and at Station 16 (994 fms.) a very small valve of the same species. It has numerous ribs, which are alternately larger and smaller, and covered with numerous close-set prickles or imbricated scales. I would provisionally name this species *senticosus*.

## 2. PECTEN VARIUS, Linné.

*Ostrea varia*, L. S. N. p. 1146.*P. varius*, B. C. ii. p. 53; v. p. 166, pl. xxii. f. 2.

'Porcupine' Exp. 1869: Loch Foyle. 1870: Atl. Tangier B.

*Distribution*. Christiansund to Egypt and Gulf of Suez; 0-55 fms.*Fossil*. Miocene. Turin. Pliocene and Post-tertiary. Scandinavia, Great Britain and Ireland, S. France, Italy, Algeria, Morea, and Rhodes; 0-150 ft.

## 3. PECTEN ISLANDICUS, Müller.

*P. islandicus*, Müll. Zool. Dan. Prodr. p. 248: G. O. Sars, Moll. reg. arct. Norv. t. 2. f. 2.

'Porcupine' Exp. 1869: St. 25 (fragments; semifossil?).

*Distribution.* Arctic seas in both hemispheres, southwards to Bergen and Connecticut, N. Japan; 2-150 fms.

*Fossil.* Pliocene and Post-tertiary. Scandinavia, Scotland, Russia, Gulf of Naples (B. C. v. p. 166), Messina; 20 fms.-470 ft.

#### 4. PECTEN PES-FELIS, Linné.

*Ostrea pes-felis*, L. S. N. p. 1146: Chemnitz, Conch.-Cab. vii. t. 64. f. 612, t. 65. f. 613.

'Porcupine' Exp. 1870: Tangier B. (young).

*Distribution.* G. Gascony to Morocco, Mediterranean, Adriatic, Ægean, Madeira, and Canaries, 'Challenger' Exp. (Fiji Islands); 18-110 fms.

*Fossil.* Pliocene, Italy, Morea, and Rhodes.

#### 5. PECTEN PES-LUTRÆ, Linné.

*Ostrea pes-lutræ*, L. Mant. Plant. p. 547.

*P. septem-radiatus*, B. C. ii. p. 62; v. p. 166, pl. xxiii. f. 1, 1a.

'Lightning' Exp.: St. 2, 4, off Faroe I. (very large valve).

'Porcupine' Exp. 1869: St. 3, 6, 15, 23, 23a, 25, 65. 1870: Atl. 1, 2, 3, 6 (var. *alba*), 8, 9, 10, 13, 16, 17, 26-30; Med. Capo de Gata, Cartagena B., G. Bona, Benzert Road, Rasel Amoush, G. Tunis, Adventure Bank, off Rinaldo's Chair.

*Distribution.* Finmark to the Sea of Marmora, and the Adriatic; 10-300 fms.

*Fossil.* Pliocene and Post-tertiary. Scandinavia, Great Britain and Ireland, Belgium, Vienna Basin, S. France, Africa, Italy, and Rhodes; 0-440 ft.

There are at least a dozen synonyms for this variable species, including *P. septemradiatus*, Müller, *Ostrea inflexa*, Poli, and *P. dumasii*, Payraudeau. The last named variety agrees more nearly with Linné's description of *Ostrea pes-lutræ* in having very small ears, "*Auriculæ vix ullæ s. altera minuta*." The Linnean name appears to have been first recognized and adopted by the late M. Gay in his 'Catalogue des Mollusques du Département du Var,' 1858. The editors of the 'Journal de Conchyliologie' object to compound names of species; but we have the great authority of Linné for many such names. As to the names of species derived from English persons, unnecessary confusion is avoided by using their ordinary compound names, *e.g.* Wyville-Thomson, the simple surname Thomson being very common and belonging to several naturalists.

#### 6. PECTEN SULCATUS, Müller.

*P. sulcatus*, Müll. Zool. Dan. Prodr. p. 248.

*P. aratus*, B. C. ii. p. 64; v. p. 167, pl. xcix. f. 5.

'Lightning' Exp.: Station 4.

'Porcupine' Exp. 1869: St. 13, 14, 25, 65. 1870: Atl. 1, 2, 3, 24-30; Med. 45, Capo de Gata, Adventure Bank. In some specimens, as well from the Atlantic as from the Mediterranean, the ribs are more knotty or tuberculous than in others.

*Distribution.* Loffoden I. to the Morea, Malta, and the Adriatic ; 20-470 fms.

*Fossil.* Pliocene and Post-tertiary. Coralline Crag, Belgium, Biot, Messina ; 0-30 ft.

*Ostrea arata* of Gmelin and *P. bruei* of Payraudeau. When I adopted Gmelin's specific name, I overlooked the relative dates of Müller's and Born's publications ; that of Müller is anterior by two years, viz. 1776, while Born's was 1778. Müller's description, although short, is unmistakable.

#### 7. PECTEN OPERCULARIS, Linné.

*Ostrea opercularis*, L. S. N. p. 1147.

*P. opercularis*, B. C. ii. p. 59, pl. ii. f. 1 ; v. p. 166, pl. xxii. f. 3, 3a.

'Lightning' Exp.: St. 4.

'Porcupine' Exp. 1869 : St. 2, 33, 35. 1870 : Atl. 1, 2, 3, 8, 9, 10, Setubal B., C. Sagres, 26, 36, Tangier B. ; Med. 50, 55, G. Bona, Benzert Road, Rasel Amoush, G. Tunis, Adventure Bank, off Rinaldo's Chair. Specimens have a more or less strongly imbricated sculpture.

*Distribution.* Iceland to the Sea of Marmora, Adriatic, Madeira, Canaries, and the Azores ; 5-205 fms. The depth recorded for the variety *audouinii* from the Mediterranean cable is questionable.

*Fossil.* Pliocene and Post-tertiary. Scandinavia, Great Britain and Ireland, Belgium, N. Germany, S. France, Italy, Algeria, Morea, Rhodes, Madeira ; 0-600 ft.

#### 8. PECTEN PHILIPPII, Récluz.

*P. philippii*, Récl. Journ. de Conch. iv. p. 52, t. ii. f. 15, 16 (1853).

'Porcupine' Exp. 1870 : Atl. St. Setubal B., C. Sagres, 26, 36 ; Med. 50, Benzert Road, Rasel Amoush.

*Distribution.* Mediterranean, Adriatic, Madeira, Canaries ; 20-100 fms.

*Fossil.* Pliocene. S. Italy and Rhodes.

Distinguishable from *P. opercularis* by its smaller size, more convex or gibbous shape, broader and flattened ribs, and smaller ears. Monterosato altered the specific name to *commutatus*, because *philippii* had been used by Michelotti previously to Récluz for another and a fossil species ; but, as Brugnone has lately pointed out, Michelotti's species belong to *Pleuronectia* or *Amussium*. According to Hörnes, that species is the *Pecten duodecimlamellatus* of Bronn, which has precedence of Michelotti's name by eight years.

#### 9. PECTEN MAXIMUS, Linné.

*Ostrea maxima*, L. S. N. p. 1144.

*P. maximus*, B. C. ii. p. 73 ; v. p. 169, pl. xxiv.

'Porcupine' Exp. 1870 : Atl. St. Vigo B., Tangier B. ; Med. Algeiras B., G. Bona, Benzert Road. Young specimens.

*Distribution.* Christiansund to Sicily, Madeira, and the Canaries; laminarian zone to 78 fms.

*Fossil.* Upper and middle Pliocene and Post-tertiary. Scandinavia, Great Britain and Ireland, Holland, Belgium, S. France, Italy, Algeria; 0-106 ft.

It is difficult to separate *P. maximus* from *P. jacobæus*. Are they distinct species?

#### 10. PECTEN FLEXUOSUS, Poli.

*Ostrea flexuosa*, Poli, Test. utr. Sic. ii. p. 161, t. xxviii. f. 11.

'Porcupine' Exp. 1870: Atl. St. 29; Med. Benzert Road, Rasel Amoush.

*Distribution.* Loire-Inférieure, Atlantic coast of Spain, Portugal, Strait of Gibraltar, Mediterranean, Adriatic, Ægean, Madeira; 2-110 fms.

*Fossil.* Miocene, Pliocene, and Post-tertiary. S. France, Algeria, and Italy.

*P. polymorphus* of Bronn and Philippi.

#### 11. PECTEN GLABER, Linné.

*Ostrea glabra*, L. S. N. p. 1146.

*O. citrina*, Poli, Test. utr. Sic. ii. t. xxviii. f. 15.

'Porcupine' Exp. 1870: Atl. St. 30; Med. Algesiras B.,

*Distribution.* Portugal to Smyrna, Adriatic, Black Sea, and the Crimea; 2-120 fms.

*Fossil.* Pliocene. S. France, Algeria, Italy, Morea.

*Ostrea sulcata* of Born, and many other synonyms.

#### 12. PECTEN TIGRINUS, Müller.

*P. tigrinus*, Müll. Zool. Dan. Prodr. p. 248.

*P. tigrinus*, B. C. ii. p. 65; v. p. 167, pl. xxii. f. 2, 2a.

'Lightning' Exp.: St. 2, 5.

'Porcupine' Exp. 1869: St. 23a, 33, 68, the Minch. 1870: Atl. Setubal B.

*Distribution.* Iceland and Norway to Vigo; 5-180 fms.

*Fossil.* Pliocene and Post-tertiary. Norway, Great Britain, Belgium?, Biot, Barcelona, Calabria, and Sicily; 0-130 ft. I give the Belgian localities for this and some other species with considerable hesitation, because I have not yet succeeded in having an opportunity of critically examining and comparing the Belgian fossils which bear the names of recent species. I have already shown (B. C. v. p. 175) that the *Arca pectunculoides* of Nyst, from the "sable noir" of Antwerp, is very different from the recent species of that name.

#### 13. PECTEN STRIATUS, Müller.

*P. striatus*, Müll. Zool. Dan. Prodr. p. 248: B. C. ii. p. 69; v. p. 168, pl. xxiii. f. 4.

'Porcupine' Exp. 1869: St. 6, 9, Galway B., 14, 45a, 45b, 70, Little Minch, near Belfast, off Lerwick.

*Distribution.* Finmark and Faroe I. to Sicily; 5-180 fms.

*Fossil.* Pliocene and Post-tertiary. Scandinavia, Red Crag at Woodbridge, Biot, Italy; 0-130 ft.

Among other synonyms is *P. rimulosus* of Philippi, who identified it with the present species in his letter to Scacchi in 1844. It is not the *P. striatus* of v. Münster, from the Tertiaries of N. W. Germany.

#### 14. PECTEN TESTÆ, Bivona.

*P. testæ* (Bivona MS.), Philippi, Cat. Moll. Sic. i. p. 11, t. v. f. 17; B. C. ii. p. 67; v. p. 167, pl. xxiii. f. 3.

'Porcupine' Exp. 1869: St. 2, 6, 23a, 25. 1870: Atl. Vigo B., Tangier B.; Med. off Jijeli, Benzert Road.

*Distribution.* Norway to the Ægean, and the Adriatic; 10-130 fms. The depth from which the Mediterranean cable was recovered, with the specimen attached to it, depending on the information received by Prof. A. Milne-Edwards, is doubtful.

*Fossil.* Pliocene. Biot, Monte Mario, and Sicily.

#### 15. PECTEN SIMILIS, Laskey.

*P. similis*, Lask. Mem. Wern. Soc. i. p. 387, t. viii. f. 8.; B. C. ii. p. 71; v. p. 168, pl. xxiii. f. 5.

'Porcupine' Exp. 1869: St. 1, 3, 6, 9, Galway B., 13, 14, 18, 25, 33, 35. 1870: Atl. 1, 2, 3, 10, 12, Vigo B., 16, 17a, Setubal B., off C. Sagres, 27-30; Med. Cartagena B., Rasel Amoush (one valve, striated inside more distinctly than usual, and named by me *Pleuronectia lævis*), Adventure Bank, off Rinaldo's Chair.

*Distribution.* Finmark to the Gulf of Egina, Adriatic, Madeira, Jamaica, and Corean Sea; 2-300 fms.

*Fossil.* Pliocene and Post-tertiary. Coralline Crag, Glacial bed in Fifeshire, Belgium, Plaisantin, S. Italy, Rhodes.

Not *P. pygmaeus* of v. Münster, which is a species of *Amussium*.

#### 16. PECTEN GROENLANDICUS, G. B. Sowerby.

*P. groenlandicus*, G. B. Sowerby, Thes. Conch. part ii. p. 57, pl. xiii. f. 40 (1842).

'Porcupine' Exp. 1869: St. 23a, 40, 47. 1870: Atl. 6, 8, 9. Young only, and in this state closely resembling *P. similis*; but the sculpture is very different. The latter species is marked by concentric striæ in both valves, while *P. groenlandicus* has in the upper valve numerous impressed lines, arranged lengthwise and irregularly, and the lower valve is microscopically reticulated.

*Distribution.* Arctic Seas in the North Atlantic, from Smith Sound to Bergen and the Gulf of St. Lawrence, White Sea and coasts of Russian Lapland; 5½-1785 fms.

*Fossil.* 82° 27' N. lat., Norway, Scotland, and Maine; from 30-40 ft. in depth to 200 ft. in height.

The shell is far from being "equivalve," as Sowerby described it. *P. vitreus* of Gray, but not Chemnitz's species of that name.

17. *PECTEN FRAGILIS*, Jeffreys. (Plate XLV. fig. 1.)

*P. fragilis*, Jeffr. in Ann. & Mag. N. H. Nov. 1876, p. 424.

'Porcupine' Exp.: 1869, St. 23*a* (young, but perfect and living); 1870, Atl. 16, 17 (fragments).

*Distribution*. 'Valorous' Exp.; 1450-1750 fms. Norwegian Arctic Exp. 1876-8; 656-1333 fms. According to Friele there are no ocelli in the edge of the mantle.

18. *PECTEN VITREUS*, Chemnitz.

*Pallium vitreum*, Chemn. Conch.-Cab. vii. p. 335, t. 67. f. 637*a*.

*Pecten vitreus*, B. C. v. p. 168, pl. xcix. f. 6.

'Lightning' Exp.: St. 6, 7.

'Porcupine' Exp. 1869: St. 3, 4, 5, 6, 13, 23, 23*a*, 47. 1870: Atl. 1, 2, 3, 6, 8, 9, Vigo B., 16, 17*a*, off C. Espichel, 24, 26, 27, 28, 28*a*, 31-34. Some specimens from the same locality are more or less covered with tubercles or short scales on the concentric lines of growth; others are quite smooth and constitute the variety *abyssorum*. The microscopic striæ which radiate from the beak are also sometimes nearly wanting in young specimens.

*Distribution*. Greenland, Iceland, Scandinavia, Shetland, S.W. France, coast of Portugal, Mediterranean, N.E. America, var. *abyssorum* 'Challenger' Exp. (W. Patagonia); 20-600 fms. Herr Friele dredged a specimen at Bergen attached to *Primnoa*, which measured an inch in length and breadth.

*Fossil*. Pliocene and Post-tertiary. Norway, Sicily.

1. *AMUSSIUM FENESTRATUM*, Forbes.

*Pecten fenestratus*, Forb. Rep. Brit. Assoc. 1843, pp. 146, 192.

*P. philippii*, Acton, Ricerche conchiliologiche, 1855, f. 1*a*.

*P. actoni*, v. Martens, Mal. Bl. 1857, p. 194, t. iii. f. 1-3.

'Porcupine' Exp. 1870: Atl. St. 24, 27, 28, 28*a*, 36; Med. Cartagena B., Adventure Bank, off Rinaldo's Chair. Var. *cancellata*. White and of thinner texture, with the concentric ridges less numerous than the longitudinal striæ, which are equal in size; it is also destitute of the inside ribs. 'Porcupine' Exp. 1869, St. 37, from the great depth of 2435 fathoms; a living specimen. A remarkable monstrosity occurred in an upper valve from the Adventure Bank having the proper sculpture of the lower valve, viz. being concentrically and closely striated; and the upper valve of another specimen has partly its own decussated sculpture and partly that of the lower valve. The sculpture is very variable, and is more or less deficient as well on the outside as in the inside of both valves; and the ears of the lower valve are nearly equal in two specimens.

*Distribution*. Coast of Portugal, Mediterranean, and Ægean; 50-250 fms.

*Fossil*. Pliocene. Sicily and Rhodes.

*P. inæquisculptus*, Tiberi. *P. concentricus* of Forbes is the lower valve of either this species or *A. koskynsi*. In neither of these species is the shell "æquivalvis," as described by him; nor did he notice the

inside sculpture. *P. alaskensis* of Dall, from Port Etches in the North Pacific is allied to the present species; but it differs not only in its much greater size, but also in the external sculpture, and in the number of internal ribs, which are from 17 to 21 in *A. fenestratum* and from 31 to 35 in *A. alaskense*.

## 2. AMUSSIUM HOSKYNSEI, Forbes.

*Pecten hoskynsi*, Forb. Rep. Brit. Assoc. 1843, p. 192; G. O. Sars, Moll. reg. arct. Norv. p. 20, t. 2. f. 1, 1 a-e.

'Porcupine' Exp. 1869: St. 23, 39, 65. 1870: Atl. 1, 2, 3, 24-30; Med. 55. In specimens from the last-named station (1456 fms.) the upper valve is smooth or nearly so, and the inside ribs are entirely or partly absent. The microscopic sculpture of the young is very beautiful.

*Distribution*. Novaya Zembla, off Spitzbergen and Jan Mayen I., E. coast of Greenland, Norway, Sicily, Ægean, and off the Azores; 30-650 fms. Arctic specimens are very large, measuring fully three quarters of an inch.

*Fossil*. Pliocene and Post-tertiary. Norway, Calabria, and Sicily.

Syn. *Pecten fimbriatus* and *P. antiquatus* (upper and lower valves), Philippi, and *P. imbrifer*, Lovén. The sculpture is variable, although the upper valve is usually more or less covered lengthwise with rows of pustules or frills, and the lower valve is closely striated in the line of growth. The full number of internal ribs is 17. *P. pustulosus* of Verrill, from the coast of New England, is probably this species; but I have not been able to see more than a single specimen, which was smooth inside.

## 3. AMUSSIUM LUCIDUM, Jeffreys.

*Pleuronectia lucida* (Jeffr.), Wyville-Thomson, Depths of the Sea, p. 464, f. 78.

*A. lucidum*, Jeffr., in Ann. & Mag. Nat. Hist. Nov. 1876, p. 425.

'Porcupine' Exp. 1869: St. 39, 41, 420. 1870: Atl. 3a, 16, 17, 17a.

*Distribution*. 'Valorous' Exp., 'Challenger' Exp. (west of Azores and Pernambuco), Gulf of Mexico; 156-1450 fms.

Var. *striata*. Upper valve marked by fine, close-set, and more or less distinct longitudinal striæ; 'Porcupine' Exp. 1870, Atl., St. 17a; 'Challenger' Exp. (off Marion I.), 1375 fms. The number of inside ribs varies from 9 to 15.

## A. Shell equilateral, completely closed. *Limatula*.

### 1. LIMA SARSII, Lovén.

*Limea sarsii*, Lov. Ind. Moll. Scand. p. 32.

*Lima sarsii*, B. C. ii. p. 78; v. p. 169, pl. xxv. f. 1.

'Lightning' Exp.: St. 2, 5.

'Porcupine' Exp. 1869: St. 15, 23a, 65. 1870: Atl. 1, 2, 3, 6, 24, 26-30; Med. 55, Adventure Bank.



*Distribution.* Vadsoe to Shetland, and throughout the Mediterranean; 80-300 fms.

*Fossil.* Pliocene. Sicily, Rhodes.

Probably the *Lima* (*Limatula*) *crassa* of Forbes; but his diagnosis was incomplete and unsatisfactory. He did not even notice the peculiar imbricated sculpture caused by the transverse or concentric striae. Lovén not only described his species accurately and with sufficient fulness to ensure identification, but he rightly assigned it to the genus (or rather subgenus) of Broun, which he characterized by having the hinge-plate denticulated.

At Station 26 of the 'Porcupine' Expedition of 1870 occurred a minute oval valve (1 millimetre =  $\frac{1}{25}$  of an inch long), which differs from a young *L. sarsii* of the same size in being more solid, and apparently adult. It is slightly ribbed lengthwise, instead of being imbricated or nodulous; the hinge is not shouldered; and the hinge-plate is very broad and obtusely triangular, with a proportionally large cartilage-pit. It may be provisionally named *L. subcostata*.

## 2. LIMA ELLIPTICA, Jeffreys.

*Lima elliptica*, B. C. ii. p. 81; v. p. 169, pl. xxv. f. 2.

'Lightning' Exp.: St. 2, 5.

'Porcupine' Exp., 1869: St. 3, 13, 61, the Minch. 1870: Atl. 3, off C. Sagres, 27, 28, 28a, 36, Tangier B.; Med. Basel Amoush, Adventure Bank, off Rinaldo's Chair.

*Distribution.* Loffoden I. to the Archipelago, Adriatic, Newfoundland, and N. Japan; 6-400 fms.

*Fossil.* Pliocene and Post-tertiary. Norway, Coralline Crag, Belgium, Hungary, Italy, Rhodes; 0-100 ft.

This may be partly the *Ostrea nivea* of Brocchi—not the fossil (which has no furrow), but the species noticed by him as recent, and measuring half an inch in length. His fossil and recent species of the same name were evidently different; and the former only was described and figured. The *O. nivea* of Renier cannot be recognized; his work is a mere catalogue of names. *L. (Limatula) cuneata* of Forbes is described as "auriculis inaequalibus." In the present species, as well as in the next, the ears are quite equal.

## 3. LIMA SUBOVATA, Jeffreys. (Plate XLV. f. 2.)

*Lima subovata*, Jeffr. in Ann. & Mag. N. H. Nov. 1876, p. 427.

'Porcupine' Exp. 1869: St. 19, 20, 23, 23a, 47 (var. *angustior*; smaller, oblong, and narrower). 1870: Med. 55.

*Distribution.* 'Valorous' Exp., 'Challenger' Exp. (off the Azores); Norwegian arctic Exp. 1878; Dutch arctic Exp., Sicily; 16-1450 fms. Arctic specimens are gigantic compared with those from Sicily, being about three quarters of an inch in length.

*Fossil.* Pliocene. Palermo.

## 4. LIMA SUBAURICULATA, Montagu.

*Pecten subauriculata*, Mont. Test. Brit. Suppl. p. 63, t. 29. f. 2.

*Lima subauriculata*, B. C. ii. p. 82; v. p. 169, pl. xxv. f. 3.

'Lightning' Exp.: St. 2, 5, 6, 7.

'Porcupine' Exp. 1869: St. 14, 23 a, 62. 1870: Atl. 2, 9, off C. Sagres, 26-30, 36, Tangier B.; Med. 55, off Rinaldo's Chair.

*Distribution*. Wellington Channel, Davis Strait, Novaya Zembla, Iceland to Gibraltar, Mediterranean, Adriatic, Ægean, Canary Isles, Labrador to Sable I., and W. coast of N. America; 10-1785 fms.

*Fossil*. Pliocene and Post-tertiary. Norway, Coralline Crag, Belgium, Vienna Basin, Italy, and Rhodes; 0-80 ft.

Synonyms. *L. sulcata* (Leach), Möller; *L. elongata*, Forbes; *L. sulculus* (Leach), Lovén; *L. uncostata*, Leach, and *L. nivea* (Renier), Philippi. Forbes has both *L. subauriculata* and *L. elongata* in his Report on Ægean Invertebrata, giving 15-30 fms. as the range of depth for the former species, and 55-140 fms. for the latter.

B. Shell inequilateral, more or less gaping or open at the sides.

*Mantellum*.

## 5. LIMA LOSCOMBII, G. B. Sowerby.

*Lima loscombii*, Sow., Gen. Sh. (*Lima*), f. 4: B. C. ii. p. 85, pl. ii. f. 2, 2 a; v. p. 178, pl. xxv. f. 4.

'Porcupine' Exp. 1869: St. 6, Galway B., 68. 1870: Atl. Vigo B., 31-34, Tangier B.; Med. 55, Benzert Road.

*Distribution*. Loffoden Isles to the Adriatic and Ægean, Tene-riffe; 5-205 fms.

*Fossil*. Pliocene and Post-tertiary. Norway, Red and Coralline Crag, Belgium, Italy, Rhodes; 0-240 ft.

## 6. LIMA HIANS, Gmelin.

*Ostrea hians*, Gmel., L. S. N. ed. xiii. p. 3332.

*L. hians*, B. C. ii. p. 87; v. p. 170, pl. xxv. f. 5.

'Porcupine' Exp. 1870: Atl. St. Vigo B., 36.

*Distribution*. Loffoden Isles to the Morea, Adriatic, Mogador, Madeira, Canaries, and Azores; 0-110 fms.

*Fossil*. Pliocene and Post-tertiary. Coralline Crag, Scotland, Ireland, Vienna Basin, Sicily, and Rhodes.

## 7. LIMA EXCAVATA, Fabricius.

*Ostrea excavata*, Fabr. in Schröter's Naturg. t. ii. p. 117.

*Excavata fabricii*, Chemn. Conch.-Cab. t. 68. f. 654.

'Lightning' Exp., St. 5. A hinge and part of the valves, quite fresh and united by the cartilage. Perhaps taken by a fish on the Norwegian coast, and carried out to sea.

'Porcupine' Exp. 1870: Atl. St. 22, 24, 25. Fragments of old and young specimens. Semifossil?

*Distribution*. Scandinavia, from Finmark to Bohuslän. 'Chal-

lenger' Exp. (W. Patagonia and off Japan); 10-775 fms. Herr Friele informs me that by sinking a dredge in Osterfiord, almost perpendicularly, to the depth of 350 fathoms, he has brought up this grand and beautiful species, with also living specimens of *Mytilus edulis* and *Littorina rudis*, and that *L. excavata* attaches itself by a strong byssus to rocks close to the shore.

*Fossil.* Pliocene and Post-tertiary. Norway, Altavilla?, and Sicily.

Apparently *L. solida* of Calcare.

#### Family V. AVICULIDÆ.

AVICULA HIRUNDO, Linné.

*Mytilus hirundo*, L. S. N. p. 1159.

*A. hirundo*, B. C. ii. p. 95; v. p. 170, pl. xxv. f. 6.

'Porcupine' Exp. 1870: Atl., St. 10, 13, off C. Sagres, 27, 28, 28a, 36, Tangier B.; Med. off Jijeli, Rasel Amoush.

*Distribution.* Southern coasts of England to the Adriatic and Ægean, Madeira, Canaries, Azores; 0-205 fms.

*Fossil.* Pliocene. Coralline Crag, S. Italy.

One of the two specimens still preserved in the Linnean collection of shells as "*Mytilus hirundo*," is certainly the present species. In the 'Systema Naturæ' the first reference is to the 'Mus. Ulr. Reg.,' where the description agrees with the European species, although no habitat is given; the second reference is to Lister's 'Hist. Conch.,' who cites D'Argenville for the vernacular name "Dattici," used by the Genoese. Lamarck called the species *A. tarentina* and *A. atlantica*, describing the former as "valvis æqualibus," and the latter (more appropriately) as "valvis inæqualibus."

PINNA RUDIS, Linné.

*Pinna rudis*, L. S. N. p. 1159: B. C. ii. p. 99, pl. iii. f. 1, and frontispiece; v. p. 170, pl. xxvi.

'Porcupine' Exp. 1870: Atl., St. 13, Vigo B., off C. Sagres, Gibraltar B., Tangier B.; Med. 50, 50a, Rasel Amoush.

*Distribution.* Great Britain and Ireland to the Adriatic and Morea, Madeira, Canaries, and Azores; 0-80 fms.

*Fossil.* Pliocene. Coralline Crag (fragments), Belgium, Italy, and Rhodes.

There is no end of synonyms. Poli, Payraudeau, Philippi, and many other conchologists of repute have adopted the Linnean name *rudis*. The shape and sculpture are extremely variable.

#### Family VI. MYTILIDÆ.

1. MYTILUS EDULIS, Linné.

*Mytilus edulis*, L. S. N. p. 1157: B. C. ii. p. 104, pl. iii. f. 2; v. p. 171, pl. xxvii. f. 1.

'Porcupine' Exp. 1870: Atl. St. Vigo B. and Gibraltar B. Valves only.

*Distribution.* Circumpolar, and throughout the North Atlantic, Adriatic, Mediterranean to Smyrna, North Pacific to Mexico, Kerguelen Land, 'Challenger' Exp. (New Zealand and Falkland I.); usually littoral or tidal, but occasionally living below the laminarian zone.

*Fossil.* Pliocene and Post-tertiary. Greenland, Iceland, Scandinavia, Great Britain and Ireland, Belgium, S. France, Italy to Ustica I., Labrador and N.E. America southwards to Florida; 0-1360 ft.

This very common species has been called by nearly twenty names. It varies greatly in size, from the stunted form (*incurvata*) to the arctic variety (*gigantea*), specimens of the latter being nine or ten inches long.

## 2. MYTILUS PICTUS, Born.

*Mytilus pictus*, Born, Test. Mus. Cæs. p. 111 (1778); p. 127, t. vii. f. 6, 7 (1780).

'Porcupine' Exp., 1870: Med. St. Capo de Gata, 51, Adventure Bank. Valves only.

*Distribution.* S. W. and S. France, S. Spain, Adriatic, Algiers, Malta, Morocco, W. and S. Africa, Canaries; 0-10 fms.

*M. africanus* of Chemnitz and *M. afer* of Gmelin.

## 3. MYTILUS ADRIATICUS, Lamarck.

*Mytilus adriaticus*, Lam. An. s. Vert. vi. p. 112: B. C. ii. p. 116; v. p. 171, pl. xxvii. f. 4.

'Porcupine' Exp. 1869: St. Loch Foyle. 1870: Atl. Vigo B., Tangier B.; Med. Benzert Road, Adventure Bank.

*Distribution.* Finmark to Malta and Egypt, Adriatic, Canaries; 2-50 fms.

*Fossil.* Pliocene and Post-tertiary. Belfast, Italy.

Many synonyms, but all now obsolete.

## 4. MYTILUS INCURVATUS, Philippi.

*Modiola incurvata*, Phil. En. Moll. Sic. i. p. 72, t. 4. f. 20.

'Porcupine' Exp. 1870: Med. St. 50a. A single living specimen. The byssus is very long.

*Distribution.* Benicarlo in Valencia; 15 fms.

*Fossil.* Pliocene. Sicily.

My specimen, which I have considered the same species as Philippi's fossil, undoubtedly belongs to the species lately described and figured as *Modiola martorelli* by Dr. Hidalgo in his excellent work on the marine Mollusca of Spain, Portugal, and the Balearic Isles. Through the kindness of the Abbé Brugnone, I have now had an opportunity of carefully comparing his fossil specimen from Sicily with my recent specimen from the 'Porcupine' Expedition of 1870; and I can see no difference between them, except that the former has a more curved or arched contour. But this is evidently a variable character in the recent form, judging from my inspection at Palermo of a specimen sent by Dr. Hidalgo to the Marquis de Mon-

terosato, in which some degree of curvature is observable. After I had written the above I received from Dr. Hidalgo (to whom my best thanks are due for this and other favours) a fine specimen of his *M. martorelli*, which is considerably incurved in front, with a corresponding arcuation at the back; and it exactly resembles Brugnone's fossil specimen.

#### 5. MYTILUS MODIOLUS, Linné.

*Mytilus modiolus*, L. S. N. p. 1158: B. C. ii. p. 111; v. p. 171, pl. xxvii. f. 2.

'Porcupine' Exp. 1870: Atl. Setubal B. A fragment, perhaps fossil.

*Distribution.* Iceland to the west coast of France, White Sea, Labrador to New York, Behring Strait to California and Japan, not Greenland nor Spitzbergen; 0-100 fms. Von Schrenck gives as synonyms *Modiola philippinarum* of Hanley and *Modiola australis* of Gray, the former from the Philippine Isles, and the latter from Australia. If these identifications are correct, they would imply a more extensive distribution.

*Fossil.* Pliocene and Post-tertiary. Scandinavia, Great Britain and Ireland, Belgium, Italy, Labrador to Nantucket I.; 0-470 ft.

#### 6. MYTILUS BARBATUS, Linné.

*Mytilus barbatus*, L. S. N. p. 1156: B. C. ii. p. 114; v. p. 171, pl. xxvii. f. 3.

'Porcupine' Exp. 1870: Atl. St. Vigo B.; Med. Benzert Road (valves).

*Distribution.* S. & W. England, Wales, and Ireland, southwards to Malta and Alexandria, N. Japan and Gulf of Yedo; 0-95 fms.

*Fossil.* Pliocene. Red Crag, and Italy.

#### 7. MYTILUS PHASEOLINUS, Philippi.

*Modiola phaseolina*, Phil. Moll. Sic. p. 51, t. xv. f. 14.

*Mytilus phaseolinus*, B. C. ii. p. 118; v. p. 171, pl. xxvii. f. 5.

'Porcupine' Exp. 1869: St. 1, 2. 1870: Atl. Vigo B., 25, off C. Sagres, 26, 30, Tangier B.; Med. Cartagena B., 50, 51, Rasel Amoush, off Rinaldo's Chair.

*Distribution.* Iceland and Finmark to the Ægean and Adriatic; 0-3000 fms.

*Fossil.* Pliocene and Post-tertiary. Norway, Coralline Crag, Belgium, Italy, and Rhodes; 0-100 ft.

Among other synonyms are probably *Mytilus barbatus* of Müller and Fabricius, but not of Linné, and certainly *Modiola pusio* of Mörch, but not of Philippi.

I dredged a minute valve of *Mytilus bidens*, Linné, in the 'Porcupine' Expedition of 1870, at Station 17a. A Foraminifer (*Rhabdammina abyssorum*, M. Sars) was attached to it. *M. bidens* is a West-Indian species, and has been acclimatized at Barcelona.

## 1. MODIOLARIA MARMORATA, Forbes.

*Mytilus marmoratus*, Forb. Mal. Mon. p. 44.*Modiolaria marmorata*, B. C. ii, p. 122, pl. iii. f. 3; v. p. 171, pl. xxviii. f. 1.

'Porcupine' Exp. 1869: St. 9, the Minch. 1870: Atl. Vigo B., Tangier B.; Med. Cartagena B., Capo de Gata, Adventure Bank.

*Distribution*. Bergen to Smyrna, Adriatic, Mogador, Gulf of Suez and Persian Gulf, Canaries, N. Pacific, perhaps S. Carolina as *Crenella lateralis* of Say; 10-150 fms.*Fossil*. Pliocene and Post-tertiary. Coralline and Red Crag, Belfast, Belgium, Italy.Cantraine's specific name *subpicta* has precedence of *marmorata* by three years; and that given by Say, *lateralis* (if applicable to the present species), is still older; but *marmorata* is now in general use.

## 2. MODIOLARIA DISCORS, Linné.

*Mytilus discors*, L. S. N. p. 1159.*Modiolaria discors*, B. C. ii. p. 126; v. p. 171, pl. xxviii. f. 3.

'Lightning' Exp.: St. 1, 3.

*Distribution*. Arctic ocean in both hemispheres, 'Valorous' Exp., Iceland to Guernsey, west coast of France, Piedmont, Ægean, N.E. America from Labrador to Cape Cod, and N. Pacific southwards to Oregon and Japan; 0-1785 fms.*Fossil*. Pliocene and Post-tertiary. Scandinavia, Great Britain, Vienna Basin?, N.E. America; 0-100 ft.*Modiola lævigata* and *substriata* of Gray and *Modiola lævis* of Beck are varieties of the present species, and connected by intermediate gradations with the typical form.

## 3. MODIOLARIA NIGRA, Gray.

*Modiola nigra*, Gray, Suppl. to App. to Parry's first voyage, p. ccxlv.*Modiolaria nigra*, B. C. ii. p. 128; v. p. 171, pl. xxviii. f. 4.

'Lightning' Exp.: St. off the Faroe Isles.

'Porcupine' Exp. 1869: St. off Lerwick.

*Distribution*. With *M. discors* as arctic, Iceland to the Dogger bank, Holland?, N.E. and N.W. America, Novaya Zembla, Sea of Okhotsk; 7-350 fms.*Fossil*. Post-tertiary. Iceland, Norfolk?, Scotland, N.E. America.This may have been the *Mytilus striatulus* of Linné's 'Mantissa,' as Beck supposed; but the term "unidentato" makes it doubtful. It is the *Modiola nexa* of Gould.

## 4. MODIOLARIA SUBCLAVATA, Libassi.

*Modiola subclavata*, Lib. Mem. Conch. foss. in Atti Pan. iii. (1859), p. 13, f. 7.

'Porcupine' Exp. 1870: Atl. St. Vigo B., Tangier B. Valves only.

*Distribution.* Brittany, G. Gascony, N. Spain, Provence, Canaries; 12-50 fms.

*Fossil.* Pliocene. Siena, Palermo.

*Modiola gibberula* of Cailliaud, and *Lithodomus semigranatus* of Reeve. Differs from *Modiolaria petagnæ* (with which it has been found) in size, shape, sculpture, and the prolongation of the terminal beard-like epidermis.

#### CRENELLA DECUSSATA, Montagu.

*Mytilus decussatus*, Mont. Test. Brit. Suppl. p. 69.

*Crenella decussata*, B. C. ii. p. 133, pl. iii. f. 4; v. p. 172, pl. xxviii. f. 6.

'Lightning' Exp.: St. 4, 5.

'Porcupine' Exp. 1870: Med. Adventure Bank. Valves, smaller than North-Atlantic specimens.

*Distribution.* Spitzbergen to the coasts of Northumberland and co. Antrim, Novaya Zembla, White Sea, and coasts of Russian Lapland, Davis Strait to New England, N. Pacific (Catalina I. and Corea); 0-1750 fms.

*Fossil.* Pliocene and Post-tertiary. Norway, Scotland, Sicily; 0-40 ft.

#### DACRYDIUM VITREUM (Holböll), Möller.

*Modiola? vitrea* (Holböll), Möll. Ind. Moll. Grœnl. p. 19.

*Dacrydium vitreum*, Torell, Spitzb. Moll. p. 138, t. i. f. 2a, b.

'Porcupine' Exp. 1869: St. 23, 23a, 25, 37, 38, 65. 1870: Atl. 16, 17, 17a, 22, 30.

*Distribution.* Swedish arctic Exp. 1868, 'Valorous' Exp. 1875, Novaya Zembla, Norwegian arctic Exp. 1877 and 1878, 'Challenger' Exp. (between the Azores and Bermuda), Norway from Vadsoe to Christianiafiord, both sides of the Mediterranean, Gulf of St. Lawrence, New England; 30-2750 fms.

*Fossil.* Pliocene and Post-tertiary. Elie in Fifeshire, Cassel, Palermo.

*Modiola pygmæa* of Philippi and *Dacrydium hyalinum* of Monterosato. I cannot discover any difference except size to distinguish Mediterranean from North-Atlantic specimens. As to the name and characteristics of the genus *Dacrydium*, I would refer to the 'Annals and Magazine of Natural History' for November 1876, p. 429.

This remarkable and pretty mollusk makes a nest (like *Modiolaria discors* and *Lima hians*) consisting of a narrow tubular case twice the length of the shell. The case is lined with a delicate membrane, and coated with minute Foraminifera, fragments of sponge, and coccospheres, which are firmly agglutinated. The *Dacrydium* inhabits the broader and lower half of the case, its front or "ventral" margin lying in the direction of the narrower part or opening.

*IDAS ARGENTEUS*, Jeffreys. (Plate XLV. fig. 3.)

*Idas argenteus*, Jeffr. in Ann. & Mag. N. H. Nov. 1876, p. 428.

'Porcupine' Exp. 1870, Atl. St. 16.

*Distribution*. 'Valorous' Exp.; 1450 fms.

## Family VII. ARCIDÆ.

### 1. *ARCA BARBATA*, Linné.

*A. barbata*, L. S. N. p. 1140: Poli, Test. utr. Sic. ii. p. 135, t. xxv. f. 6, 7: B. C. ii. p. 183; v. p. 176.

'Porcupine' Exp. 1870: Atl. St. Gibraltar B.

*Distribution*. Atlantic coasts of France from Quimper to Rochelle, Cadiz, Mogador, throughout the Mediterranean and Adriatic; 2-100 fms.

*Fossil*. Miocene and Pliocene. S.W. and S. France, Vienna Basin, Galicia, Transylvania, Volkynia, Italy, Morea, Cyprus and Rhodes, Madeira.

### 2. *ARCA LACTEA*, Linné.

*A. lactea*, L. S. N. p. 1141: B. C. ii. p. 177; v. p. 175, pl. xxx. f. 5.

'Porcupine' Exp. 1870: Atl. St. Vigo B., 36, Tangier B., Gibraltar B.; Med. 50, 55, Adventure Bank.

*Distribution*. Berwick B. and Oban southwards to Mogador, and eastwards to the Morea, Adriatic, Red Sea, Senegal, Canaries; 0-150 fms.

*Fossil*. Miocene, Pliocene, and Post-tertiary. England and Ireland, S.W. and S. France, Podolia, Vienna Basin, Transylvania, Italy, Cyprus and Rhodes; 0-600 ft.

Several obsolete synonyms.

### 3. *ARCA NODULOSA*, Müller.

*A. nodulosa*, Müll. Zool. Dan. Prodr. p. 247: B. C. ii. p. 180; v. p. 176, pl. c. f. 2.

'Lightning' Exp.: St. 2, 4, 5.

'Porcupine' Exp. 1869: St. 13, 14, 51, 61, 65. 1870: Atl. 3, 9, 16, 17 a, 24, 26-29; Med. 45, 55, 58, Adventure Bank.

*Distribution*. Loffoden Isles to the Ægean, Adriatic, Josephine Bank, Canaries, G. Mexico; 10-700 fms.

*Fossil*. Pliocene and Post-tertiary. Norway, S. France, Italy; 0-100 ft.

Having carefully examined and compared more than one hundred specimens from the North Atlantic and Mediterranean, I am convinced that *A. scabra* of Poli is merely a coloured variety of the present species. Some specimens are oval, others oblong; the angle of the hinge-line on either side is of different degrees of acuteness or obtuseness; and the texture and sculpture are finer or coarser according to the nature of the locality and sea-bottom. Specimens from the Gulf of Mexico are undistinguishable from Norwegian. In



a fossil state it is the *A. aspera* of Philippi. I must admit, however, the great difficulty of deciding whether certain species ought to be united or separated. This cannot be attempted without sufficient materials and experience.

#### 4. *ARCA TETRAGONA*, Poli.

*A. tetragona*, Poli, Test. utr. Sic. ii. p. 137, t. xxv. f. 12, 13: B. C. ii. p. 180, pl. iv. f. 5, 5a; v. p. 176, pl. xxx. f. 6, 6a.

'Porcupine' Exp. 1870: Atl. St. Vigo B., 26, Tangier B.; Med. 55, Benzert Road, Rasel Amoush, Adventure Bank, off Rinaldo's Chair.

*Distribution.* Finmark to Mogador, the Adriatic, Mediterranean, Ægean, Madeira, Canaries, Azores, 'Challenger' Exp. (Fernando Noronhas); 0-450 fms.

*Fossil.* Pliocene and Post-tertiary. Norway, Great Britain and Ireland, Belgium, S. France, Italy, and Madeira,

Synonyms rather numerous, but none worth recording. *A. tetragona* was apparently the small Norwegian species noticed by Linné as resembling *A. tortuosa*, and to which Müller and Pennant gave the latter name.

#### 5. *ARCA NOÆ*, Linné.

*A. noæ*, L. S. N. p. 1140 (partly); Poli, Test. utr. Sic. t. xxiv. f. 1, 2.

'Porcupine' Exp. 1870: Med. St. Benzert Road.

*Distribution.* Morbihan and Charente Inférieure, Cadiz, throughout the Mediterranean to Egypt, Adriatic, Red Sea, Teneriffe, N. Carolina to West Indies; 0-100 fms.

*Fossil.* Miocene and Pliocene. Vienna Basin, S. France, Algiers, Italy, Morea, Rhodes, Cyprus, and the Azores.

Marketable and eaten at Spezzia, Venice, Naples, and Malta.

#### 6. *ARCA ANTIQUATA*, Linné.

*A. antiquata*, L. S. N. p. 1141 (partly): Poli Test. utr. Sic., t. xxv. f. 14, 15.

'Porcupine' Exp. 1870: Atl. St. Setubal B., 22, C. Sagres, 26, 30, 36, Tangier B.; Med. 10, 55, G. of Bona, Benzert Road, Rasel Amoush, Adventure Bank.

*Distribution.* Mogador and throughout the Mediterranean from Gibraltar to the Sea of Marmora, Adriatic, Red Sea to Madeira, Canaries, New England from Cape Cod southwards; 20-100 fms.

*Fossil.* Miocene and Pliocene. N.W. Germany, Vienna Basin, S.W. and S. France, Barcelona, Malaga, Algiers, Italy, and Morea.

This is assuredly the *A. antiquata* of Poli. Linné founded his species on the wretched and unsatisfactory figures of Bonanni and other antiquated conchologists. It is also in part the *A. antiquata* of Lamarck; his *A. diluvii* was described from an Eocene species, and is different. Mayer proposed *polii* for our shell; but Brugnone says that two species were included under that name. Judging from

Say's description of *A. transversa* and the figures lately given by Binney and Tryon, as well as from specimens which Mr. Dall has kindly sent me, I am inclined to consider it either the same as the present species or at most a variety of it. In Weinkauff's collection of Algerian shells is a specimen three and a half inches long, with 32 ribs, the usual number being 28. A monstrosity in the same collection was named by M. Crosse *A. weinkauffi*. There are several other synonyms.

#### 7. *ARCA OBLIQUA*, Philippi.

*A. obliqua*, Phil. Moll. Sic. ii. p. 43, t. xv. f. 2: B. C. ii. p. 175; v. p. 175, pl. xxx. f. 4.

'Lightning' Exp.: St. 5.

'Porcupine' Exp. 1869: St. 14, 15, 25, 65. 1870: Atl. 2, 3, 24, 25, C. Sagres, 26-30, 36; Med. 45, 55, 58, Adventure Bank, off Rinaldo's Chair.

*Distribution*. Bergen and Shetland to the Ægean, Azores; 30-600 fms.

*Fossil*. Pliocene. S. France, Calabria, and Sicily.

Having now reexamined a great number of recent and fossil specimens from various localities, I must separate this from the next species for the following reasons:—*A. obliqua* is not merely much smaller, but it is shorter (measured from the beak to the front margin), and more sharply angulated on the anterior side; the striae are nodulous; and the teeth are more numerous, and straight instead of being set obliquely on the anterior side, as in *A. glacialis*. Both species are somewhat inequivalve. Some specimens of *A. obliqua* have the inside of the front margin regularly and closely denticulated.

#### 8. *ARCA GLACIALIS*, Gray.

*A. glacialis*, Gray in Suppl. App. Parry's first voyage, p. cexliv; Torell, Spitzb. Moll. t. ii. f. 7, a, b.

'Porcupine' Exp. 1869: St. 23 a, 89. Valves only, and perhaps semifossil relics of the last glacial epoch.

*Distribution*. Arctic seas in both northern hemispheres, Iceland, and G. of St. Lawrence; 25-1622 fms.

*Fossil*. Post-tertiary. Scandinavia, Maine; 0-240 ft.

Not *A. glacialis* of Mighels.

#### 9. *ARCA PECTUNCULOIDES*, Scacchi.

*A. pectunculoides*, Sc. Ann. Civ. due Sic. vii. p. 82 (1833): B. C. ii. p. 171; v. p. 175, pl. xxx. f. 3.

'Lightning' Exp.: St. 2, 5, 7.

'Porcupine' Exp. 1869: St. 1, 6, 14, 15, 17, 23, 25, 61, 62, 65, off Lerwick. 1870: Atl. 1, 2, 3, 6, 8, 9, 12, 13, 14, Setubal B., 24-34; Med. 45, Cartagena B., 55, Benzert Road, Adventure Bank, off Rinaldo's Chair.

*Distribution*. Davis Strait to G. of St. Lawrence and Halifax.

'Valorous' Exp., Spitzbergen, Loffoden Isles to G. of Egina, 'Challenger' Exp. (off Culebra I., Danish West Indies); 20-1170 fms.

*Fossil.* Pliocene and Post-tertiary. Norway, Coralline Crag (not Belgian), S. France, Italy, Rhodes; 0-100 ft.

Var. *septentrionalis*. Larger, more triangular and oblique, and finely striated lengthwise, but not reticulated.

This form resembles that of the next species.

'Lightning' Exp.: St. 135.

'Porcupine' Exp. 1869: St. 23 *a*. 1870: Atl. 16, 17, 17 *a*.

*Distribution.* 'Bulldog' Exp., Norwegian arctic Exp. 1876, 1877, and 1878, Dutch arctic Exp., Finmark; 146-656 fms.

*Fossil.* Pliocene. Palermo and Messina, with the typical form.

Risso described this species in 1826 as *A. grenophia*; but the name may be considered obsolete. It is also the *A. raridentata* of Searles Wood.

10. *ARCA FRIELEI*, Jeffreys. (Plate XLV. figs. 4, 4 *a*.)

*A. frielei* (Jeffr.), Friele in Mag. f. Naturvid. xxiii. h. 3, p. 2 (1877).

'Porcupine' Exp. 1869: St. 65.

*Distribution.* Norwegian arctic Exp., 1876-8; 459-1333 fms.

Named in honour of Herr Herman Friele of Bergen, who undertook with such ability the charge of the Mollusca in the last-mentioned expeditions. This and the preceding two species belong to the section or subgenus *Cucullæa*, in which the teeth are comparatively few and placed obliquely. *A. frielei* has been lately figured in the Jahrb. d. D. malak. Ges. Ht. ii. 1879, t. 4. f. 9; but the hinge is represented as toothless, and I therefore have it refigured.

*GLOMUS NITENS*, Jeffreys. (Plate XLV. figs. 5, 5 *a*.)

*G. nitens*, Jeffr. in Ann. & Mag. N. H. Nov. 1876, p. 433.

'Porcupine' Exp. 1869: St. 16, 19 *a*, 20, 21, 22, 30, 31, 39.

*Distribution.* 'Valorous' Exp.; 1750 fms.

The genus *Glomus* is remarkable for its globular shape, its elongated and slanting cartilage, and the teeth being few and set obliquely.

*SILICULA*<sup>1</sup>, Jeffreys.

SHELL oval or oblong, open at the anterior or longer end: *cartilage* internal, minute: *teeth* laminar, parallel with the hinge-line, and not at right angles to it or diagonal, as in other genera of the *Arca* family.

I at first thought of *Phaseolus* as an appropriate generic name; but as that is so well known in Botany, I have substituted *Silicula* for the Mollusk. The type, which I will now describe, somewhat resembles an *Estheria* in shape; but the valves of the carapace in the Crustacean are punctated, and there is no true hinge. The Abbé Brugnone and the Marchese di Monterosato have discovered in the Tertiary formation at Ficarazzi, near Palermo, a minute fossil species of *Silicula*, for which the name *ovata* is proposed.

<sup>1</sup> A little pod.

SILICULA FRAGILIS<sup>1</sup>, Jeffreys. (Plate XLV. figs. 6, 6a.)

BODY clear white; *foot* axe-shaped.

SHELL ensiform or obliquely oblong, inequilateral, compressed, thin, glossy, nacreous, and semitransparent: *sculpture* extremely fine and numerous but irregular concentric striae, which are only observable with a magnifying glass; there are also occasional lines of growth: *colour* white, under a pale brownish-yellow epidermis: *margins* nearly straight at the back on the anterior side, rounded at the other side, extended and wedge-shaped at the anterior side, the extremity of which is truncated, with a slight notch or indentation in the middle, gradually curved in front: *beaks* placed near the smaller end, at about one third the length of the back; they are small, rather prominent, and calyciform: *lunule* well defined, lance-head-shaped, and elongated: *ligament* none: *cartilage* and pit oblique: *hinge-line* long, nearly straight on the anterior side, and gently curved on the other side: *hinge-plate* rather narrow: *teeth* elongated, four on each side, somewhat like the lateral teeth in *Tellina*, but overlapping one another, and not continuous: they are of different lengths, those at each end being the shortest and strongest: *inside* polished and iridescent, microscopically fretted towards the front margin: *scars* inconspicuous. L. 0.15, B. 0.3.

'Porcupine' Exp. 1869: St. 16, 28.

A. More or less angulated or pointed at the longer end.

## 1. LEDA PERNULA, Müller.

*Arca pernula*, Müll. in Beschäft. Berl. Ges. naturf. Fr. iv. p. 57 (1779).

*L. pernula*, B. C. ii. p. 158; v. p. 173: G. O. Sars, Moll. reg. arct. Norv. t. v. f. 1 a-d.

'Porcupine' Exp. 1869: St. 4, Loch Torridon. 1870: Atl. 1, 2, 6, 9. One perfect specimen (but dead) and several valves of different sizes, all being more or less smooth or destitute of concentric striae.

*Distribution*. Arctic Ocean in the N. Atlantic southwards to the Cattegat on the east and Maine on the west, Novaya Zembla, Behring Strait; 5-210 fms.

*Fossil*. Post-tertiary or "glacial." N. lat. 82°, N.E. America, Archangel, Scandinavia, Great Britain and Ireland; 0-1360 ft.

Being variable in shape and sculpture, this species has many synonyms.

## 2. LEDA MINUTA, Müller.

*Arca minuta*, Müll. Zool. Dan. Prodr. p. 247.

*L. minuta*, B. C. ii. p. 155, pl. iv. f. 2; v. p. 173, pl. xxix. f. 6.

'Porcupine' Exp. 1869: St. 1, 23a, 25, North Channel, the Minch, Little Minch, near Belfast. 1870: Atl. 2, 9 (valves only, and perhaps semifossil).

*Distribution*. Arctic seas in both hemispheres, to the Cattegat

<sup>1</sup> Brittle.

and Bay of Fundy in the N. Atlantic and to Japan in the N. Pacific ; 5-150 fms.

*Fossil.* Post-tertiary or "glacial." Scandinavia, Great Britain and Ireland, Labrador and Canada ; 0-130 ft.

The most common synonym is *L. caudata*, Donovan.

### 3. LEDA FRAGILIS, Chemnitz.

*Arca fragilis*, Chem. Conch.-Cab. vii. p. 199, t. 55. f. 546.

'Porcupine' Exp. 1870 : Atl. St. 10, Vigo B., 13, Setubal B., off C. Espichel, 22, 27-30, 36, Tangier B. ; Med. 45, Cartagena B., 50, 54, 55, Benzert Road, Rasel Amoush, Adventure Bank, off Rinaldo's Chair. Abundant in the Mediterranean cruize.

Some specimens are more closely striated than others.

*Distribution.* Atlantic coasts of France and Lusitania from Arcachon to C. Trafalgar, throughout the Mediterranean to the Ægean, Adriatic, G. of Florida ; 20-185 fms.

*Fossil.* Miocene and Pliocene. Belgium, N.W. Germany, Vienna Basin, Transylvania, Switzerland, S.W. & S. France, Italy, Greece, and Rhodes.

This species was unmistakably described and figured by Chemnitz ; and his specific name *fragilis* was adopted by that painstaking naturalist Dillwyn, and since by Hörnes and Hidalgo, although the last considered it distinct from the *Nucula commutata* of Philippi, which is certainly the present species. Risso, Chiereghini, and Eichwald gave it other names.

### 4. LEDA PELLA, Linné.

*Arca pella*, L. S. N. p. 1141.

*A. interrupta*, Poli, Test. utr. Sic. ii. t. 25. f. 4, 5.

'Porcupine' Exp. 1870 : Med. St. 50, 55, G. of Bona, Benzert Road, G. of Tunis, Adventure Bank. Varies in the sculpture, like *L. fragilis*.

*Distribution.* Atlantic coasts of Spain and Portugal, throughout the Mediterranean to the Sea of Marmora, Adriatic, Japan ; 4-100 fms.

*Fossil.* Miocene and Pliocene. Antwerp Crag, Poland, Vienna Basin, Switzerland, S.W. France, Italy, Greece, Rhodes and Cyprus.

The principal synonyms are *Arca interrupta* of Poli and *Nucula emarginata* of Payraudeau.

### 5. LEDA ARCTICA, Gray.

*Nucula arctica*, Gray in Suppl. App. Parry's first voyage, p. celi (1824).

*Portlandia arctica*, G. O. Sars, Moll. reg. arct. Norv. p. 37, t. 4. f. 7a-h.

*L. arctica*, B. C. ii. p. 158.

'Porcupine' Exp. 1869 : St. Loch Torridon. A fine and perfect specimen and two valves, all apparently subfossil.

*Distribution.* Circumpolar in the N. Atlantic and Pacific, Novaya Zembla, Jenissei B., 'Valorous' Exp., Norwegian arctic Exp. 1878, Iceland, Finmark; 5-1333 fms.

*Fossil.* Post-tertiary or "glacial." Norway and Sweden, Scotland, N.E. America; 60 fms.-70 ft.

*Nucula glacialis*, Leach; *N. truncata*, Brown; *N. portlandica*, Hitchcock; *N. siliqua* and *N. sulcifera*, Reeve.

#### 6. LEDA MESSANENSIS, Seguenza.

*L. acuminata*, Jeffr. in Ann. & Mag. N. H. July 1870, p. 69: Seguenza, Nuculidi terziarie merid. d'Ital. (R. Acad. Linc. 1877, separate copy), p. 15, t. iii. f. 15, 15 a-e.

'Porcupine' Exp. 1869: St. 3, 15, 16, 23, 42. 1870: Atl. 1, 2, 3, 3a, 6, 9, Vigo B., 22, 24, off C. Sagres, 25-34, 36; Med. 55, Adventure Bank.

*Distribution.* 'Valorous' Exp., W. Norway, Mediterranean, 'Josephine' Exp. (Azores), 'Challenger' Exp. (between Azores and Bermuda); 100-1750 fms.

*Fossil.* Pliocene. S. Italy.

Body clear white: *mantle* having its edges protruded and pointing; these are plain or slightly jagged, and not ciliated: *tubes* separate; the upper tube is cylindrical and long, and has two minute tubercles at the point, one above and the other below: *foot* extensible, and shaped like that of its congener.

The shell is variable in length, and is wholly or partly marked (especially in front) by close and regular concentric striae.

After I had published the specific name *acuminata*, I found that it had been preoccupied for an Oolitic species, the *Nucula acuminata* of Von Buch, which is also a *Leda*. I have therefore substituted in the case of the present species Professor Seguenza's MS. name *messanensis*. Eichwald's *L. acuminata* is *L. fragilis*.

#### 7. LEDA PUSTULOSA, Jeffreys.

*L. pustulosa*, Jeffr. in Ann. & Mag. N. H. Nov. 1876, p. 430; Seg. Nuc. terz. p. 17, t. iii. f. 17, 17a-d.

'Porcupine' Exp. 1869: St. 16, 19, 20, 21, 23, 23a, 28, 30, 31, 58. 1870: Atl. 2, 3a, 17a, 27, 30.

*Distribution.* 'Valorous' Exp., 1450 fms.

*Fossil.* Pliocene. S. Italy.

#### 8. LEDA FRIGIDA, Torell.

*Foldia frigida*, Tor. Spitzb. Moll. p. 148, t. i. f. 3.

'Porcupine' Exp. 1869: St. 9, 23a, 28, 31, 36. 1870: Atl. 1, 2, 3, 3a, 6, 9, 16, 22, 24, 26-34.

*Distribution.* Spitzbergen, 'Valorous' Exp., Novaya Zembla, Norwegian arctic Exp. 1877 and 1878, Loffoden Isles to Shetland, Palermo, G. of St. Lawrence, N. Japan; 3-650 fms.

*Fossil.* Pliocene and Post-tertiary. English last arctic Exp. (N. lat. 82° 33'), Norway, Reggio and Messina.

The teeth are much more numerous and finer than in *L. pustulosa*.

*Yoldia nana* of M. Sars.

#### 9. LEDA TENUIS, Philippi.

*Nucula tenuis*, Phil. En. Moll. Sic. i. p. 65, t. v. f. 9.

*L. pygmæa*, B. C. ii. p. 154; v. p. 173, pl. xxix. f. 5.

'Lightning' Exp.: St. 2, 3, 5, 7.

'Porcupine' Exp., 1869: St. 1, 8, 13, 14, 15, 17, 18, 23a, 35, 61, 62, Loch Torridon. 1870: Atl. 1, 2, 3a, 9, 13, 22, 24, off C. Sagres, 26-34; Med. 45, Cartagena B., 55, Benzert Road, Adventure Bank, off Rinaldo's Chair.

*Distribution*. Scandinavia to the Ægean; 10-650 fms.

*Fossil*. Pliocene and Post-tertiary. Siberia?, Scandinavia, Great Britain and Ireland, Belgium?, Transylvania?, Biot, Italy; 0-240 ft.

This species was referred by Philippi in his second volume to the *Nucula pygmæa* of Von Münster; but the description and figure of the latter species given by Goldfuss in his 'Petrefacta Germaniæ,' and specimens of the fossils kindly sent me by Dr. Wiechmann, have convinced me that they are different species. I have therefore adopted Philippi's original name *tenuis*. The well-known *Nucula tenuis* of Montagu belongs to another genus; but Philippi did not distinguish the genus *Leda*, and therefore changed his name for that of Von Münster. According to Forbes, *N. gibbosa* of James Smith is a variety of the present species. *L. tenuis* does not appear to inhabit the Arctic seas, although *L. lenticula* of Möller, = *Yoldia abyssicola*, Torell, has been mistaken for it by some authors, which makes it difficult to verify all the localities mentioned by them.

#### 10. LEDA LENTICULA, Möller.

*Nucula lenticula*, Möll. Ind. Moll. Grœnl. p. 17.

*Yoldia abyssicola*, Torell, Spitz. Moll. t. i. f. 4, a, b.

'Porcupine' Exp. 1869: St. 9, 23a, Loch Torridon (perfect but dead and perhaps semifossil, like *L. arctica*). 1870: Atl. 34, 27, 28, 30. Valves only.

*Distribution*. Wellington Channel, Davis Strait, Dutch arctic Exp., Novaya Zembla, Norwegian arctic Exp. 1878, Shetland (semifossil?); 20-656 fms.

*Fossil*. Post-tertiary or "glacial." Norway, Clyde beds, Siberia, Labrador, Canada, Maine.

I agree with Professor G. O. Sars that this may be Möller's species; but the description is so short and indeterminate that it is almost equally applicable to *L. tenuis*. The late Professor M. Sars regarded it as a variety of the latter species, and as the *Nucula gibbosa* of James Smith. It is the *Yoldia abyssicola* of Torell, but not of M. Sars.

The present species is gibbous; and the anterior end is much more marked and upturned than in *L. tenuis*.

## 11. LEDA STRIOLATA, Brugnone.

*Yoldia striolata*, Brugn. Misc. Mal. (pars secunda, 1877), p. 9, f. 9.  
*Y. abyssicola*, Seg. Nuc. terz. d'It. (1877), t. v. f. 28, 28a.

'Lightning' Exp.: St. 3.

'Porcupine' Exp. 1869: St. 39, 42, 47. 1870: Atl. 3a, 9, 16, 17, 17a, off C. Espichel, 22, 24, 31-34.

*Distribution*. Palermo; 114 fms.

*Fossil*. Pliocene. Calabria and Sicily.

Differs from the last species (*L. lenticula*) in being flatter, more sharply pointed or wedge-shaped at the anterior end, and concentrically striated; the striae are regular and sometimes numerous, but usually distant and covering the front only. The epidermis in living specimens is yellowish-green. *Striolata* is not a classical word; and I had provisionally named this species *acutalis*, but of course give way to the previous publication. Monterosato gave it the MS. name of *producta*.

## 12. LEDA INTERMEDIA, M. Sars.

*Portlandia intermedia*, (M. Sars), G. O. Sars, Moll. reg. arct. Norv. p. 38, t. 4. f. 9, a-b.

'Porcupine' Exp. 1870: Atl. St. 16. A few valves, mostly imperfect.

*Distribution*. Greenland, Spitzbergen, 'Fox' Exp., Novaya Zembla, Norwegian arctic Exp. 1878, Dutch arctic Exp., Finmark; 25-1333 fms.

Not a North-Pacific species which I received from Mr. Dall as the *Yoldia intermedia* of Sars on the authority of the late Dr. Philip Carpenter.

## 13. LEDA LUCIDA, Lovén.

*Yoldia lucida*, Lov. Ind. Moll. Scand. p. 34.

*L. lucida*, B. C. ii. p. 155; v. p. 173, pl. c. f. 1.

'Lightning' Exp.: St. 1, 2, 3, 5.

'Porcupine' Exp. 1869: St. 9, 13, 14, 15, 16, 19, 22, 28, 62. 1870: Atl. 1, 2, 3, 3a, 9, 13, 16, 17, 17a (var. *declivis*; anterior end more sloping and not so much upturned nor pointed), 17b (var. *truncata*; anterior end abruptly cut off); Med. 55.

*Distribution*. Swedish arctic Exp. 1868, 'Valorous' Exp., Novaya Zembla, Norwegian arctic Exp. 1878, Finmark to Bohuslän, Palermo, G. St. Lawrence to Massachusetts B.; 10-730 fms.

*Fossil*. Post-tertiary or "glacial." Norway, and Clyde beds. According to his description and figure, Seguenza's *Yoldia lucida* is a variety of *L. pellucida*. The latter species differs from *L. lucida* in being wedge-shaped and terminating in a point on the anterior side; *L. lucida* is in that part more or less upturned and squarish.

The present species is *L. obesa* of Stimpson.

## 14. LEDA PUSIO, Philippi.

*Nucula pusio*, Ph. Moll. Sic. ii. p. 47. t. xv. f. 5.

*L. pusio*, var. *laticor*, Jeffr. Ann. and Mag. N. H. Nov. 1876, p. 430.

'Porcupine' Exp. 1869; St. 16, 28; 1870, Atl. 3a, 16, 17a, off



C. Espichel, 22. This form appears to be the variety *salicensis* of Seguenza. Another variety, which I would call *semistriata*, is smoother, thinner, more glossy, and is partially striated either at the anterior end only or towards the front margin. It occurred in the 'Lightning' Expedition, Station 6, and in the 'Porcupine' Atlantic Expedition of 1870 at the following Stations, 2, 3, 6, 8, 9, 17, 24, 26-28a, 30-54. Young specimens of both varieties are nearly oval.

*Distribution.* 'Valorous' Exp. (var. *salicensis*), 'Josephine' Exp. (off the Azores; var. *semistriata*); 550-1750 fms.

*Fossil.* Pliocene. Vienna Basin, Italy from Leghorn to Messina. Var. *semistriata*, Messina.

#### B. Rounded at both ends.

##### 15. LEDA SERICEA, Jeffreys. (Plate XLVI. fig. 1.)

*L. sericea*, Jeffr. in Ann. and Mag. N. H. Nov. 1876, p. 432.

'Porcupine' Exp. 1869: St. 19, 21, 30. 1870: Atl. 1 (var. *ovata*, longer in proportion to the breadth, but having the characteristic sculpture of the species), 16, 17, 17a.

*Distribution.* 'Valorous' Exp.; 1450 fms.

##### 16. LEDA JEFFREYSI, Hidalgo. (Plate XLVI. fig. 2.)

*L. lata*, Jeffr. in Ann. and Mag. N. H. Nov. 1876, p. 431.

'Porcupine' Exp. 1869: St. 9, 20, 30, 31. 1870: Atl. 16, 17, 17a.

*Distribution.* 'Valorous' Exp., 'Challenger' Exp. (between the Azores and Bermuda); 690-1785 fms.

Dr. Hidalgo, in his work above mentioned, has pointed out that the specific name *lata* (which I gave this shell) had been preoccupied by Mr. Hinds in the 'Zoology of the Voyage of H.M.S. Sulphur' (1845) for a New-Guinea species, and that, although named there *Nucula lata*, it belonged to the genus *Leda*. He accordingly proposed to cancel the name *lata* and call the present species by my own name, a compliment for which I am grateful.

##### 17. LEDA SUBÆQUILATERA<sup>1</sup>, Jeffreys. (Plate XLVI. fig. 3.)

SHELL transversely oblong-oval, nearly equilateral, somewhat depressed, rather thin, glossy, semitransparent: *sculpture* none except a few irregular periodical lines of growth: *colour* whitish: *epidermis* yellowish-white: *margins* obtuse-angled and pinched up at the back, equally rounded at each end, slightly produced or extended on the anterior side, gently curved in front: *beaks* almost central, prominent, rather gibbous, and incurved: *lunule* wanting, in consequence of the pouting and sharp margin at the back: *cartilage* and pit very minute, the latter sunken: *hinge-line* obtuse-angled: *hinge-plate* rather narrow, but strong: *teeth* small, erect and comb-like, 8 on each side, besides 4 or 5 minute tubercles near the beak:

<sup>1</sup> Nearly equilateral.

inside smooth and polished; edge sharp and plain: *scars* indistinct.  
L. 0.225, B. 0.35.

'Lightning' Exp.: St. 3.

'Porcupine' Exp. 1869: St. 23, 23a, 65. 1870: Atl. 3, 9, 17, 17a.

*Distribution.* Norwegian arctic Exp. 1878; 459-778 fms.

Differs from *L. jeffreysi* in its somewhat greater size, being at all ages much broader in proportion to the length (and consequently more extended on each side), the anterior end not being upturned, and in the hinder margin being sharp-edged and pinched up.

18. *LEDA MICROMETRICA*, Seguenza.

*L. micrometrica*, Seg. Nuc. terz. mer. d'It. p. 21, t. iv. f. 22, 22 a-c.

'Porcupine' Exp. 1869: St. 23a. 1870, Med. 55. Valves only.

*Distribution.* Sciacca, Sicily.

*Fossil.* Pliocene. Trapani near Messina.

I had previously given to this minute but distinct species the name *oblonga*, by which Monterosato called it.

19. *LEDA EXPANSA*, Jeffreys. (Plate XLVI. fig. 4.)

*L. expansa*, Jeffr. in Ann. and Mag. N. H. Nov. 1876, p. 431.

'Porcupine' Exp. 1869: St. 16, 30.

*Distribution.* 'Valorous' Exp.; 690-1750 fms.

20. *LEDA INSCULPTA*<sup>1</sup>, Jeffreys. (Plate XLVI. fig. 5.)

SHELL transversely oval, equilateral, rather convex, moderately solid, semitransparent, and glossy: *sculpture*, numerous and regular but minute and fine concentric impressed striae, which become stronger towards the front and are wanting at the back: *colour* white: *epidermis* pale yellowish: *margins* sinuous at the back owing to the prominence of the beaks, equally rounded on both sides, and curved in front: *beaks* central, prominent: *cartilage* and pit minute, the latter sunken: *hinge-line* forming a very obtuse angle: *hinge-plate* rather broad: *teeth* small, sharp and comb-like, deflected outwards, 8-10 on each side of the beak; they are placed on the inner side of the hinge-plate: *inside* lustrous, microscopically fretted, plain-edged: *pallial and muscular scars* rather distinct, the former being broad.  
L. 0.075. B. 0.115.

'Porcupine' Exp. 1869: St. 16. 1870: Atl. 16, 17, 17a.

Differs from *L. expansa* in shape, convexity, and sculpture.

21. *LEDA PUSILLA*<sup>2</sup>, Jeffreys. (Plate XLVI. fig. 6.)

SHELL roundish-oval, equilateral, somewhat compressed, remarkably solid for its size, opaque and glossy: *sculpture*, numerous and close-set concentric and very fine microscopic striae, which cover the whole shell: *colour* whitish: *margins* rounded on every side, except at the back so far as the continuity is interrupted by the beaks, con-

<sup>1</sup> Engraved.

<sup>2</sup> Tiny.

tracted in front: *beaks* central, but not prominent: *cartilage* and pit very small, somewhat elongated transversely: *hinge-plate* rather broad and strong: *teeth* minute and short, tubercular, 6-8 on each side: *inside* polished, plain-edged: *scars* indistinct. L. 0.0275. B. 0.0375.

'Porcupine' Exp. 1870: Atl. St. 2, 3, 3*a*, 8, 9, Vigo B., 17*a*, 24. *Distribution*. Palermo and Sciacca; 113½ fms.

Originally named by me *microscopica*; but that word is too much like *micrometrica*, which has been since used by Seguenza for another species above mentioned.

## 22. LEDA MINIMA, Seguenza.

*Yoldia minima*, Seg. Nuc. terz. merid. d'It. p. 18, t. v. f. 27, 27*a-c*.

'Porcupine' Exp. 1870: Atl. St. 3, 13, 17, 17*a*, 24; Med. 55.

*Fossil*. Pliocene. Province of Messina.

The specific name is inappropriate, because this species is not the smallest of the genus *Leda*. I had provisionally named it *subrotunda*; and Monterosato published that name, treating Seguenza's as a synonym.

## A. Edge plain or smooth.

### 1. NUCULA TENUIS, Montagu.

*Arca tenuis*, Mont. Test. Brit. Suppl. p. 56, t. xxix. f. 1.

*N. tenuis* B. C. ii. p. 151; v. p. 172, pl. xxix. f. 4.

'Lightning' Exp.: St. 3, 5, 7.

'Porcupine' Exp. 1869: St. 1, 6, 9, Galway B., 13, 17. 1870: Atl. 1, 2, 3, 9, Vigo B., 13, 16, 24, off C. Sagres.

*Distribution*. Circumpolar in the North Atlantic and Pacific, 'Valorous' Exp., Iceland to the N.W. coast of France, Mediterranean (*Nares*)!, Maine northwards, Kamptchatka Sea, Vancouver I., N. Japan; 3-365 fms.

*Fossil*. Pliocene and Post-tertiary. Scandinavia, Great Britain and Ireland, Calabria and Messina, Canada and Maine; 0-12 ft.

The arctic form is *N. inflata* of Hancock, *N. antiqua*, Mighels, *N. expansa*, Reeve, and perhaps *N. bellotii* of A. Adams. In a fossil state the typical form is *N. decipiens* of Philippi.

### 2. NUCULA ÆGEENSIS, Forbes.

*N. ægeensis*, Forb. Rep. Brit. Assoc. 1843, p. 192: Hanley, Nuculidæ, p. 56, pl. v. f. 154.

'Porcupine' Exp. 1870: Atl. St. 17*a*, 26-34, 36; Med. off Jijeli, 51, 55, Benzert Road, Adventure Bank, off Rinaldo's Chair, 58.

*Distribution*. Mediterranean eastward to the Ægean, Adriatic; 60-250 fms.

*Fossil*. Pliocene. Ficarazzi near Palermo.

Assuming this to be Forbes's species (although his description is too scanty to be satisfactory), it may be distinguished from *N. tenuis*

by its usually smaller size, thinner texture, having a rounder and less oblique outline, and being more uniformly convex; the posterior side is more abruptly angular; the beaks are more gibbous, and straight instead of inclining to one side; the hinge-line is broader, and teeth fewer; and the cartilage and pit are shorter and smaller, and not placed so obliquely as in *N. tenuis*.

*N. macandraci* of Hanley. The young was named by me *N. convera*; and the fry appears to be the *N. perminima* of Montecrosato.

### 3. *NUCULA CORBULOIDES*, Seguenza.

*N. corbuloides*, Seg. Nuc. terz. merid. d'It. p. 9, t. i. f. 3, 3a-h.

'Porcupine' Exp. 1869: St. 5, 6, 23, 40, 41. 1870: Atl. 3, 16, 17, 17a.

*Fossil*. Pliocene. Calabria and Messina district.

This somewhat resembles the young of *N. ageensis*, but is more triangular and gibbous, besides being closely and regularly striated in the line of growth. I had provisionally named it *N. gibba*.

### 4. *NUCULA DELPHINODONTA*, Mighels.

*N. delphinodonta*, Migh. and Adams, in Proc. Boston Soc. Nat. Hist. i. p. 48 (1841); ii. p. 324, pl. iv. f. 5 (1842).

'Lightning' Exp.: St. 3.

'Porcupine' Exp. 1869: St. 65.

*Distribution*. Davis Strait, 'Valorous' Exp., Norwegian arctic Exp. 1878, Norway from Vadsø to Christianiafjord, N.E. America from G. St. Lawrence to B. of Fundy; 25-410 fms.

*Fossil*. Pliocene. Sicily.

*N. corticata* of Möller. The fry are oval.

### B. Edge crenated.

### 5. *NUCULA TUMIDULA*, Malm.

*N. tumidula*, Malm in Scand. Naturf. Förh. viii. (1860), p. 621: Göt. K. Vet. Vitt. Samh. Handl. Ny tidsf. viii. (1863), p. 122, pl. 2. f. 3.

'Porcupine' Exp. 1869: St. 36, 39, 47. 1870: Atl. 3a, 6, 9, Vigo B., 16, 17, 22; Med. 55. A valve from the last station, at the depth of 1456 fathoms, is permeated by the same peculiar organism which I noticed in my papers on Mollusca from the 'Valorous' Expedition. What is it?

*Distribution*. From Finmark to Bohuslän, Palermo, 'Challenger' Exp. (off Pernambuco); 20-650 fms.

*Fossil*. Pliocene. Calabria and Sicily.

It is the *N. pumila* of Lovén MS., according to Asbjörnson=*N. nucleus*  $\beta$  in Ind. Moll. Scand. Not my var. *tumidula* of *N. nucleus*, erroneously referred by me to the present species, which I then knew only by a short description, not having seen Malm's figure or a specimen. The young in a fossil state has been lately described and

figured by Seguenza as *N. umbonata*. This species differs from *N. proxima*, Say, in shape and sculpture, and is much smaller and less solid.

6. *NUCULA RETICULATA*, Jeffreys. (Plate XLVI. fig. 7.)

*N. reticulata*, Jeffr. in Ann. and Mag. N. H. Nov. 1876, p. 429.

'Porcupine' Exp. 1869: St. 16, 19, 20, 21, 23a, 28, 30.

*Distribution*. 'Valorous' Exp., 'Challenger' Exp. (off San Miguel, Azores); 1000-1100 fms.

*N. reticulata* of Hanley (from the Philippines) is a species of *Leda*.

7. *NUCULA STRIATISSIMA*, Seguenza.

*N. striatissima*, Seg. Nuc. terz. merid. d'It. p. 6, t. i. f. 1a-c.

'Porcupine' Exp. 1870: Atl. St. 17. A single but perfect specimen.

*Fossil*. Pliocene. Messina district.

This is more closely and finely striated than any other known species of *Nucula*. The *N. trigona* of Seguenza seems to be a variety, judging from the examination of a specimen which he kindly sent me for that purpose. I do not like the barbarous name *striatissima*; but it is more characteristic than *trigona*, because all the species of the present genus are more or less triangular. Seguenza describes *N. trigona* as smooth (*laevis*); but his figure and specimen show that it is closely striated lengthwise.

8. *NUCULA SULCATA*, Bronn.

*N. sulcata*, Bronn, Italiens Tertiär-Gebilde, p. 109 (1831): B. C. ii. p. 141; v. p. 172, pl. xxix. f. 1, 1a.

'Porcupine' Exp. 1869: St. 1, 6, 9, Galway B., 13, 17, 18, the Minch, Little Minch, Loch Torridon. 1870: Atl. 3a, 9, 10, 13, Setubal B., 22, 25, off C. Sagres, 26-30, 36; Med. 45, Capo de Gata, Cartagena B., 50, off Jijeli, Benzert Road, Rasel Amoush, Adventure Bank, off Rinaldo's Chair. The sculpture varies considerably in its comparative coarseness or fineness.

*Distribution*. Norway to the Ægean and Sea of Marmora, and the Adriatic; 5-190 fms.

*Fossil*. Miocene, Pliocene, and Post-tertiary. Bohuslän, Caithness, N.W. Germany, Biot, Italy, and Rhodes.

*N. polii*, Philippi, and other obsolete synonyms. Not *N. sulcata*, A. Adams, from New Zealand.

9. *NUCULA NUCLEUS*, Linné.

*Arca nucleus*, L. S. N. p. 1143.

*N. nucleus*, B. C. ii. p. 143, pl. iv. f. 1; v. p. 172, pl. xxix. f. 2.

'Lightning' Exp.: St. 4.

'Porcupine' Exp. 1869: St. 1, 2, 6, 9, 14, 18, near Belfast. 1870: Med. Capo de Gata, Rasel Amoush.

*Distribution*. Norway to Mogador, and through the Mediterranean eastward to the coast of Egypt, and the Adriatic; 2-145 fms.

*Fossil.* Miocene, Pliocene, and Post-tertiary. Everywhere throughout Europe, Asia Minor, and Algeria; 0-350 ft.

*Glycymeris argentea* of Da Costa, *Arca margaritacea* of Bruguière, and other useless synonyms.

#### 10. NUCULA NITIDA, G. B. Sowerby.

*N. nitida*, Sow. Conch. Ill. (*Nucula*) p. 5, f. 20: B. C. ii. p. 149; v. p. 172, pl. xxix. f. 3, 3a.

'Porcupine' Exp. 1869: St. 2, 9, 18, 19. 1870: Atl. 3, Vigo B.; Med. 50, 50a (var. *ventrosa*; swollen and smooth), 51, 55, G. Bona, Benzeret Road, Tunis B., Adventure Bank.

*Distribution.* Scandinavia to Smyrna; 0-120 fms.

*Fossil.* Pliocene and Post-tertiary. Coralline Crag, Paisley, Italy.

Not *N. nitida* of Bronn, which is *Arca (Leda) nitida* of Brocchi. A streaked variety of the present species is analogous to the variety *radiata* of *N. nucleus*.

#### 1. PECTUNCULUS GLYCYMERIS, Linné.

*Arca glycymeris*, L. S. N. p. 1143.

*P. glycymeris*, B. C. ii. p. 166, pl. iv. f. 4; v. p. 175, pl. xxx. f. 2.

'Lightning' Exp.: St. 5.

'Porcupine' Exp. 1869: St. the Minch. 1870: Atl. Vigo B., Setubal B., 26, 36, Tangier B.; Med. Adventure Bank.

*Distribution.* Finmark and the Faroe Islands to Mogador, throughout the Mediterranean to Jaffa, Adriatic, Senegal, Madeira, Canaries, N. Japan; 0-120 fms.

*Fossil.* Pliocene and Post-tertiary. Great Britain and Ireland, Belgium, S. France, Italy, Rhodes.

It is difficult to verify the recorded localities for this species and *P. pilosus*, which have been evidently confounded by many authors.

*P. pilosus* is a larger, thicker, and more orbicular or globose shell; the longitudinal striae are more conspicuous and distinct; the hinge-area is wider, and the teeth are fewer and larger. The synonyms of each are numerous, but have been intermixed.

#### 2. PECTUNCULUS NUMMARIUS, Linné.

*Arca nummaria*, L. S. N. p. 1143.

*A. insubrica*, Brocchi, Conch. foss. subapp. ii. p. 492, t. xi. f. 10.

'Porcupine' Exp. 1870: Med. St. Algeiras B., 50, Adventure Bank.

*Distribution.* S.W. France, Mediterranean eastwards to the coast of Egypt, Adriatic, Madeira and Canaries; 6-120 fms.

*Fossil.* Pliocene. Coralline Crag, S. France, Italy, Morea, Rhodes, and Cyprus.

Although Linné's description was taken from a young specimen, there can be no doubt as to the species, and his name ought to be retained. It is the *P. violacescens* of Lamarck, and has many other synonyms. Poli's figure (1 in plate xxvi.), without name or reference

excellently represents this species; and so does Payraudeau's figure (pl. ii. f. 1) of *P. violaceus*.

#### A. Inside edge plain or smooth.

##### 1. LIMOPSIS AURITA, Brocchi.

*Arca aurita*, Broc. Conch. foss. subapp. ii. p. 485, t. xi. f. 9.

*L. aurita*, B. C. ii. p. 161, pl. iv. f. 3; v. p. 174, pl. xxx. f. 1.

'Lightning' Exp.: St. 2, 5, 7.

'Porcupine' Exp. 1869: St. 3, 13, 14, 23a, 25, 45, 65. 1870: Atl. 1, 2, 3, 3a, 6, 8, 9, Vigo B., 13, 24, C. Sagres, 26-30, 36, Tangier B.; Med. Adventure Bank.

*Distribution*. Shetland, off W. coast of Ireland, 'Josephine' Exp. (Josephine Bank, off Gibraltar), Palermo, 'Valorous' Exp., Wellington Channel, 'Challenger' Exp. (off the Azores, Bermuda, and Colabra I.), Japan; 21-1100 fms.

*Fossil*. Miocene and Pliocene. Denmark, Coralline and Red Crag, Holland, Antwerp, N.W. Germany, S. France, throughout Italy, and near Melbourne.

*L. obliqua* and *L. cumingii* of A. Adams. Some of his other species require further examination. The shell of *L. aurita* becomes oblique in the course of growth. In a fossil state it is the *L. (Trigonocelia) laevigata* of Nyst.

#### B. Inside edge crenated.

##### 2. LIMOPSIS CRISTATA, Jeffreys. (Plate XLVI. fig. 8.)

*L. cristata*, Jeffr. in Ann. & Mag. N. H. Nov. 1876, p. 434.

'Lightning' Exp. St. 5.

'Porcupine' Exp. 1869: St. 2, 23, 23a, 36, 40, 47. 1870: Atl. 2, 9, 17, off C. Espichel, 22, 24.

*Distribution*. 'Valorous' Exp.; 690 fms.

A young specimen of *L. minuta* is figured (Pl. XLVI. f. 9) for comparison with *L. cristata*.

##### 3. LIMOPSIS MINUTA, Philippi. (Plate XLVI. fig. 9.)

*Pectunculus minutus*, Ph. En. Moll. Sic. i. p. 63, t. v. f. 3, 3a, b; ii. p. 45.

*L. borealis*, B. C. ii. p. 164; v. p. 174, pl. c. f. 3.

'Porcupine' Exp. 1869: St. 2, 3, 15, 23, 23a, 36, 45, 65. 1870: Atl. 1, 2, 3, 3a, 6, 9, Vigo B., 13, 17a, 24-34. Var. *angusta*, St. 25. Smaller, narrower, thinner, and more oblique, slantingly truncated or contracted at the upper part of the posterior side, hinge-line shorter, and having a pinkish-brown stain at the beaks and inside near the back. Some specimens of the typical form are finely and closely reticulated; and in others the concentric ridges are crenated. See Ann. and Mag. (*supra cit.*) for further particulars as to this species.

*Distribution*. Throughout the North Atlantic in deep water from Finmark to Sicily, C. Good Hope, 'Josephine' Exp. (Azores), Nor-

wegian arctic Exp. 1878, 'Challenger' Exp. (off Fayal); 70-790 fms. Var. *angusta*, 'Challenger' Exp. (off Teneriffe); 70 fms.

*Fossil.* Miocene and Pliocene. Cassel, Mayence Basin, Italy.

Recent: *L. borealis*, Woodward, *L. abyssicola*, A. Adams, and the very young *L. tenuis*, Seguenza. *Fossil*: *Pectunculus aradasii*, Testa, *P. grossi*, Aradas, and *L. inæquidens*, Sandberger.

### 1. MALLETTIA OBTUSA, M. Sars.

*Yoldia abyssicola*, M. Sars in Christ. Vid. Selsk. Förh. (1858), p. 86.

*Y. obtusa* (M. Sars), G. O. Sars 'On some remarkable Forms of animal Life from the great Deeps off the Norwegian Coast' (1872), p. 23, pl. 3. f. 16-20.

'Porcupine' Exp. 1869: St. 19, 22, 28, 30. 1870: Atl. 9, off C. Espichel. The body is clear-white and gelatinous, and the upper tube is very long and cylindrical.

*Distribution.* Loffoden Isles to the Bergen coast, Norwegian arctic Exp. 1876 (between Norway and Iceland); 200-650 fms.

The MS. name *abyssicola*, originally given by the late eminent Professor Sars to this remarkable shell, was afterwards changed by him to *obtusa* in consequence of Torell having described and figured another shell which Sars regarded as also belonging to *Yoldia*, under the same name *abyssicola*. The present species is not the *Yoldia obtusa* of Gould (1846), from Hong-Kong harbour; but that shell belongs to the genus *Leda*; and at all events it is better to avoid further confusion by appropriating the name *obtusa* to the North-Atlantic shell. For the reasons which I gave in 'British Conchology' (ii. 153), I cannot recognize the genus *Yoldia*.

The late Dr. Mörch placed this species in the genus *Mallettia* of Desmoulins, from an examination of my specimens. A tribute of respect to his memory is justly due from all conchologists for his bibliographical research, and other valuable labours.

### 2. MALLETTIA CUNEATA, Jeffreys. (Plate XLVI. fig. 10.)

*M. cuneata*, Jeffr. in Ann. & Mag. N. H. Nov. 1876, p. 435.

'Porcupine' Exp. 1869: St. 19, 20, 28. 1870: Atl. 16, 17, 17a, off C. Espichel, 22; Med. 51.

*Distribution.* 'Valorous' Exp., Norwegian arctic Exp. 1876; 1333-1760 fms.

### 3. MALLETTIA EXCISA, Philippi.

*Nucula excisa*, Ph. Moll. Sic. ii. p. 46, t. xv. f. 4.

*M. excisa*, Jeffr. in Ann. & Mag. N. H. Nov. 1876, p. 435.

'Porcupine' Exp. 1869: St. 20, 21, 28.

*Distribution.* 'Valorous' Exp., 'Challenger' Exp. (W. of Azores and Canaries); 1125-1785 fms.

*Fossil.* Pliocene. Biot, Calabria, and Sicily.

It will be seen that the last species, as well as many other deep-water shells which have been noticed in the present paper, are Calabrian and Sicilian Tertiary fossils. Besides these species, others of the



same kind, and which had been also considered extinct (viz. *Leda* or *Tindaria solida*, Seg., *Nucula glabra*, Ph., and *Malletia dilatata*, Ph.), occurred in the 'Challenger' Expedition. The communication between the North Atlantic and the Mediterranean must have been formerly very different from what it is now, when a barrier or ridge in comparatively shallow water exists outside the Strait of Gibraltar, between Capes Spartel and Trafalgar. It is improbable that deep-sea Mollusca, even in their embryonic state, could have migrated or been transported under such conditions from one sea to another. The south of France and Italy must have experienced a great elevation, and perhaps a succession of them, since the Pliocene period. For instance, the average depth at which *Malletia excisa* has been now found living is  $1507\frac{1}{2}$  fathoms, or 9044 feet, being very nearly five-sixths of the height of Mount Etna above the present level of the sea; and to this submarine elevation must be added the height of the Pliocene beds above the sea-level. Professor Seguenza informs me that *M. excisa* occurs in Sicily, as well as in Calabria, at a height of 600 metres or nearly 2000 feet, and that these fossiliferous beds attain double that height in other parts of the same district; so that the total elevation may be estimated at from 11,000 to 12,000 feet. Mount Etna is 10,874 feet high.

I have to acknowledge my obligations to the Rev. R. Boog Watson for his kind assistance in examining and comparing some of the 'Challenger' shells above referred to.

#### SUMMARY OF THE FOREGOING MOLLUSCA.

Families.	Genera.	No. of species.
I. ANOMIIDÆ .....	ANOMIA .....	2
II. OSTREIDÆ .....	OSTREA .....	2
III. SPONDYLIDÆ .....	SPONDYLUS .....	1
IV. PECTINIDÆ .....	PECTEN .....	18
	AMUSSIUM .....	3
	LIMA .....	7
V. AVICULIDÆ .....	AVICULA .....	1
	PINNA .....	1
VI. MYTILIDÆ .....	MYTILUS .....	7
	MODIOLARIA ....	4
	CRENELLA .....	1
	DACRYDIUM ....	1
	IDAS .....	1
VII. ARCIDÆ .....	ARCA .....	10
	GLOMUS .....	1
	SILICULA .....	1
	LEDA .....	22
	NUCULA .....	10
	PECTUNCULUS ....	2
	LIMOPSIS .....	3
	MALLETIA .....	3
Total.....		101

I take this opportunity to make a few additions and corrections to Part I. of this series of papers (Brachiopoda), P. Z. S. 1878 :—

Page 401. *Terebratula caput-serpentis*, var. *septentrionalis*. Norwegian arctic Exp. 1877, Dutch arctic Exp. 1878; 210–300 fathoms!

P. 402. *Terebratula trigona* of Quensted is a species of *Rhynchonella*.

P. 408. Prof. G. O. Sars agrees with me that *Terebratula septata* and *T. septigera* are one and the same species.

P. 410. *Argiope cuneata*, G. Gascony (De Folin)!

P. 411. *Platydia anomioïdes*, G. Gascony (De Folin, as *P. davidsoni*)!

P. 412. *Thecidea mediterranea*, G. Gascony (De Folin)!

P. 415. *Discina atlantica*. 'Challenger' Exp., off the coast of N. Australia (Watson).

#### EXPLANATION OF THE PLATES.

##### PLATE XLV.

- Fig. 1. *Pecten fragilis*, p. 561.  
 2. *Lima subovata*, p. 563.  
 3. *Idas argenteus*, p. 570.  
 4. *Arca frielei*, p. 573.  
 5. *Glomus nitens*, p. 573.  
 6. *Silicula fragilis*, p. 574.

##### PLATE XLVI.

- Fig. 1. *Leda sericea*, p. 579.  
 2. — *jeffreysi*, p. 579.  
 3. — *subaequilatera*, p. 579.  
 4. — *expansa*, p. 580.  
 5. — *insculpta*, p. 580.  
 6. — *pusilla*, p. 580.  
 7. *Nucula reticulata*, p. 583.  
 8. *Limopsis cristata*, p. 585.  
 9. — *minuta* (for comparison), p. 585.  
 10. *Malletia cuneata*, p. 586.

#### 2. On the Birds collected in Bolivia by Mr. C. Buckley.

By P. L. SCLATER, M.A., Ph.D., F.R.S., and OSBERT SALVIN, M.A., F.R.S.

[Received June 17, 1879.]

The materials of our present communication are the collections made in Bolivia by Mr. Clarence Buckley, a well-known and enthusiastic collector of Lepidopterous insects. On his first expedition to this republic (in 1873–4), Mr. Buckley went principally in quest of Butterflies, and of Birds obtained only a certain number of Trochilidæ for Mr. Gould.

Before starting again for Bolivia in 1875, Mr. Buckley arranged with Messrs. Salvin and Godman to form a general series of birds for their joint collection.

The result of this agreement was the acquisition of two carefully prepared collections of about 700 skins in all, referable to about 500 species, out of which we have already described the principal novelties in two papers read before the Society in February and April 1876<sup>1</sup>. Having now gone through the whole series, we have felt unwilling to pass by the opportunity of adding something more to the general knowledge of the rich Bolivian avifauna, in which, of late years, so little has been done. We therefore propose to give, herewith, a complete list of the species obtained by Mr. Buckley, as represented by the specimens in the collection of Messrs. Salvin and Godman.

On both of Mr. Buckley's expeditions his head quarters were at La Paz, whence excursions were made into the valleys and ranges to the north and east of that city. On the second expedition the principal series of birds was obtained at Tilotilo, a group of ranchos situated on a spur of the Andes extending between the Rio de la Paz and the Rio Coroico, as explained in a former paper.

The new species discovered by Mr. Buckley during these two expeditions were 19 in number, namely:—

1. *Catharus mentalis*, Scl. et Salv. P. Z. S. 1876, p. 352.
2. *Basileuterus euophrys*, Scl. et Salv. P. Z. S. 1876, p. 352.
3. *Diglossa glauca*, Scl. et Salv. P. Z. S. 1876, p. 253.
4. *Calliste punctulata*, Scl. et Salv. P. Z. S. 1876, p. 353.
5. — *fulvicervix*, Scl. et Salv. P. Z. S. 1876, p. 354.
6. — *argyrophenges*, Scl. et Salv. P. Z. S. 1876, p. 354.
7. *Malacothraupis dentata*, Scl. et Salv. P. Z. S. 1876, p. 353.
8. *Chlorospingus calophrys*, Scl. et Salv. P. Z. S. 1876, p. 354.
9. *Buarremon melanops*, Scl. et Salv. P. Z. S. 1876, p. 253.
10. *Ochthodacta fusciorufus*, Scl. et Salv. P. Z. S. 1876, p. 354.
11. *Ochthæca pulchella*, Scl. et Salv. P. Z. S. 1876, p. 355.
12. *Anæretes flavirostris*, Scl. et Salv. P. Z. S. 1876, p. 355.
13. *Leptopogon tristis*, Scl. et Salv. P. Z. S. 1876, p. 254.
14. *Synallaxis rufipennis*, Scl. et Salv. *infra*, p. 620.
15. *Lathria uropygialis*, Scl. et Salv. P. Z. S. 1876, p. 355.
16. *Thamnophilus subfasciatus*, Scl. et Salv. P. Z. S. 1876, p. 357.
17. *Grallaria erythrotis*, Scl. et Salv. P. Z. S. 1876, p. 357.
18. *Asturina saturata*, Scl. et Salv. P. Z. S. 1876, p. 357.
19. *Leptoptila megalura*, Scl. et Salv. *infra*, p. 640.

In order to render the list of Bolivian species more complete, we have inserted references to all the species obtained in this country by d'Orbigny and other explorers which we have been able to identify satisfactorily. These are not numerous, our authorities on Bolivian ornithology being but few. We will give a short account of those known to us.

(1) *Alcide d'Orbigny*. This well-known naturalist was the first scientific explorer of Bolivia, during his great South-American journey, 1826–33. His collection of birds, the full series of which was placed in the Museum of Paris, was worked out by the late Baron F. de Lafresnaye and himself; and the results were published, first in the

<sup>1</sup> See P. Z. S. 1876, pp. 253 and 352.

form of a "Synopsis" in the 'Magasin de Zoologie' for 1837 and 1838, and subsequently in a more extended form in his great work entitled 'Voyage dans l'Amérique méridionale,' of which the "Birds" form the third part of the fourth volume. Unfortunately, the account of d'Orbigny's birds was never completed, the "Synopsis" only proceeding as far as the Accipitres, Passeres, and Picariæ, and the 'Voyage' being not quite so nearly perfect. In the remaining classes of birds many of d'Orbigny's discoveries have been since published by subsequent authors.

(2) In 1845-47 Mr. Thomas Bridges, a well-known Corresponding Member of this Society, collected in Bolivia for the late Earl of Derby, and sent home a large number of birds, which are now in the Derby Museum at Liverpool. Other specimens of the same collector found their way, through Mr. Bridges's agent Mr. Hugh Cuming, into the British Museum and other collections; but the localities attached to these specimens are not always trustworthy, as the Bolivian collections were mixed up by Mr. Cuming with those previously sent home by Mr. Bridges from Chili and Mendoza. Two letters of Mr. Bridges will be found in the Society's 'Proceedings' for 1846 and 1847<sup>1</sup>. Unfortunately no general account of Mr. Bridges's excellent collections was ever prepared or published.

(3) Mr. J. B. Pentland, who was for some years H.B.M. Consul in Bolivia, collected many birds and other objects of natural history, some of which are now in the British and French national collections<sup>2</sup>. These also have never been worked out.

(4) The Polish naturalist, M. Warszewicz, of Warsaw, explored the eastern slopes of Illimani and Sorata about 1852-53, and discovered some brilliant Humming-birds, which were described by Mr. Gould in the Society's 'Proceedings' for 1853<sup>3</sup>. M. Warszewicz collected other birds, which passed into other museums on the Continent, and of which scattered notices have appeared.

(5) The late Mr. David Forbes, the distinguished geologist, collected birds in Bolivia, some of which are now in Sclater's collection. He was the discoverer of the remarkable Grebe *Centropelma micropteron*<sup>4</sup>, upon the Lake of Titicaca.

(6) Lastly, Mr. Walter Davis, who accompanied Mr. Alexander Agassiz's exploring party to Lake Titicaca in 1875, obtained examples of six species of birds at Coroico, on the eastern slope of Illimani, as noticed in Mr. J. A. Allen's account of the birds obtained during this expedition<sup>5</sup>. Most of the other species noticed in this memoir, no doubt, occur in Bolivia as well as Peru, as Lake Titicaca

<sup>1</sup> Letter from Thomas Bridges, C.M.Z.S., addressed to G. R. Waterhouse, containing notes on Bolivian Mammals and Birds, P. Z. S. 1846, p. 7.

<sup>2</sup> "Notes in addition to former papers on South-American Ornithology," by Thomas Bridges, C.M.Z.S. P. Z. S. 1847, p. 28.

<sup>3</sup> See Mr. Pentland's paper on the Bolivian Andes, Journ. R. Geogr. Soc. v. p. 70.

<sup>4</sup> See P. Z. S. 1853, p. 61.

<sup>5</sup> Ex. Orn. p. 189, pl. xev.

<sup>6</sup> "Exploration of Lake Titicaca, by Alexander Agassiz and S. W. Garman. III. List of Mammals and Birds. By J. A. Allen, with Field-Notes by Mr. Garman," Bull. Mus. Comp. Zool. Harvard Coll. Cambridge, iii, p. 349.

is half in one republic and half in the other; but we have not thought it necessary to include them in the present list.

In the following list Mr. Buckley's localities are marked (*B.*), those of d'Orbigny (*O.*).

#### Fam. TURDIDÆ.

1. CATHARUS MENTALIS, ScL. & Salv. P. Z. S. 1876, p. 352.

Suapi (*B.*).

2. CATHARUS MACULATUS, ScL.

Tilotilo (*B.*).

3. TURDUS CROTOPEZUS, Licht.

Rio Toro, Tilotilo (*B.*).

4. TURDUS LEUCOMELAS, Vieill.

*Turdus olivaceus*, Lafr. & d'Orb. Syn. Av. i. p. 17.

*Turdus rufiventris* ♀, d'Orb. Voy. p. 203.

Mapiri, Baganti, and Tilotilo (*B.*); Santa Cruz de la Sierra (*O.*).

The skins marked *T. olivaceus* in the Paris Museum, which d'Orbigny subsequently referred to the female of *T. rufiventris*, belong to this species.

5. TURDUS GIGAS, Fraser.

Sorata, Tilotilo (*B.*).

Mr. Buckley's skins cannot be separated from *T. gigantodes*, Cab. (J. f. O. 1873, p. 315), which is only a southern form of *T. gigas*.

6. TURDUS FUSCATUS, Lafr. & d'Orb. Syn. Av. i. p. 16; d'Orb. Voy. p. 200, t. ix. f. 5.

La Paz, Enquisivi, Cochabamba, Mizqui, Valle Grande, Chuquisaca (*O.*).

There are two Bolivian examples of this Thrush collected by Bridges, and one brought from that country by Mr. D. Forbes, in Sclater's collection. They agree fairly with specimens from Mendoza (Mus. S.-G.), which, however, have usually a longer bill.

7. TURDUS CHIGUANCO, Lafr. & d'Orb. Syn. Av. i. p. 16; d'Orb. Voy. Ois. p. 201, t. ix. f. 2.

Palca, Tacna (*O.*); Tilotilo (*B.*).

Mr. Buckley's skin agrees with Mr. Whitely's specimens from Western Peru, whence d'Orbigny's types were procured.

8. TURDUS SERRANUS (Tsch.); ScL. & Salv. P. Z. S. 1870, p. 783.

Tilotilo (*B.*).

To the range of this species Bolivia must now be added.

9. *MIMUS DORSALIS* (d'Orb. et Lafr.).

*Orpheus dorsalis*, d'Orb. & Lafr. Syn. Av. i. p. 18; d'Orb. Voy. Ois. p. 211, t. xi. f. 2.

Cochabamba (O.).

In Sclater's collection, from Bolivia (*Bridges*).

10. *MIMUS TRIURUS* (d'Orb. et Lafr.).

*Orpheus tricaudatus*, d'Orb. & Lafr. Syn. Av. i. p. 18.

*Orpheus triurus*, d'Orb. Voy. Ois. p. 208.

Mission de San Jose, Chiquitos (O.).

## Fam. SYLVIIDÆ.

11. *MYIADESTES RALLOIDES* (D'Orb.).

*Muscipeta armillata*, d'Orb. & Lafr. Syn. Av. i. p. 48.

*M. ralloides*, d'Orb. Voy. Ois. p. 322.

*Myiadestes ralloides*, Scl. & Salv. Ex. Orn. pl. xxvii.

Chulumani, Prov. Yungas (O.); Guanai, Tilotilo (B.).

12. *POLIOPTILA DUMICOLA* (Vieill.).

*Culicivora bivittata*, d'Orb. & Lafr. Syn. Av. i. p. 56.

*Culicivora dumicola*, d'Orb. Voy. Ois. p. 331.

*Culicivora boliviana*, Scl. P. Z. S. 1852, p. 34, pl. 47.

Chiquitos and Moxos (O.).

In Sclater's collection, from Bolivia (*Bridges*): type of his *C. boliviana*.

## Fam. TROGLODYTIDÆ.

13. *DONACOBIVUS ALBOVITTATUS*, d'Orb. & Lafr. Syn. Av. i. p. 19; d'Orb. Voy. Ois. p. 213.

*D. lineatus*, d'Orb. ibid. t. xii. f. i.

Mission de San Jose, Prov. Chiquitos (O).

14. *CAMPYLORHYNCHUS UNICOLOR*, Lafr.

*Picolaptes scolopaceus*, d'Orb. & Lafr. Syn. Av. i. p. 46.

*Anumbius scolopaceus*, d'Orb. Voy. Ois. p. 256.

*Campylorhynchus unicolor*, Lafr. Rev. Zool. 1846, p. 93; Scl. Cat. Am. B. p. 16.

Chiquitos, Santa Cruz, Guarayos and Yuracares (O.).

The specimen in Sclater's collection agrees with Lafresnaye's description of his *C. unicolor*, but not exactly with d'Orbigny's characters (Voy. p. 256).

15. *CYPHORHINUS MODULATOR*, D'Orb.

*Troglodytes arada*, d'Orb. & Lafr. Syn. Av. i. p. 25.

*Thryothorus modulator*, d'Orb. Voy. Ois. p. 230.

*Cyporhinus modulator*, Scl. et Salv. Ex. Orn. p. 43.

Prov. Yungas (O.).

## 16. HENICORHINA LEUCOPHRYS (Tsch.).

Tilotilo (B.).

## 17. THRYOPHILUS FULVUS, Scl. P. Z. S. 1873, p. 781.

*Troglodytes guarayanus*, d'Orb. Voy. Ois. p. 203 (?).

Simacu (B.).

The type of d'Orbigny's *Tr. guarayanus* is not to be found in the Paris Museum; so the question of its identity with *T. fulvus* must remain open.

## 18. THRYOTHORUS MELANOPS, Vieill.

*Le Thryothore à oreilles noires. T. melanos*, Vieill. Enc. Méth. p. 628.

*Troglodytes coraya*, d'Orb. & Lafr. Syn. Av. i. p. 25.*Thryothorus coraya*, d'Orb. Voy. Ois. p. 229.

Carcuata, Prov. Yungas, Concepcion, Prov. Chiquitos (O.); Simacu, Tilotilo (B.).

Vieillot's term *melanos* is, no doubt, a misprint for *melanops*. Bolivian specimens agree with others from Brazil.

## 19. TROGLODYTES FURVUS, d'Orb. &amp; Lafr.

*Troglodytes furva*, d'Orb. & Lafr. Syn. Av. i. p. 26.*T. platensis*, d'Orb. Voy. p. 131.

La Paz, Prov. Yungas, Sicasica, Valle Grande (O.); Ramosani, Caguarani (B.).

## 20. TROGLODYTES SOLSTITIALIS, Scl.

Tilotilo (B.).

## 21. CISTOTHORUS POLYGLOTTUS (Vieill.).

Rhapaguaia (B.).

## Fam. MOTACILLIDÆ.

## 22. ANTHUS BOGOTENSIS, Scl.

*Anthus rufescens*, d'Orb. & Lafr. Syn. Av. i. p. 27; d'Orb. Voy. Ois. p. 226.

*Anthus bogotensis*, Scl. Cat. Am. B. p. 24; Ibis, 1878, p. 357.

Mountain of Biscachal, near Carcuata, Prov. Yungas (O.).

## 23. ANTHUS FURCATUS, d'Orb. &amp; Lafr. Syn. Av. i. p. 27; et d'Orb. Voy. p. 227; Sclater, Ibis, 1878, p. 364.

Cochabamba (O.).

## Fam. MNIOTILTIDÆ.

## 24. PARULA PITIAYUMI (Vieill.).

*Sylvia venustula*, d'Orb. & Lafr. Syn. Av. p. 20.*S. venusta*, d'Orb. Voy. Ois. p. 218.

Prov. Yungas, Sicasica, Valle Grande (O.); Tilotilo (B.).

25. *DENDRÆCA CÆRULEA* (Wils.).Nairapi, Tilotilo (*B.*).

This extends the southern range of this North-American species, already known from Bogota (Mus. P. L. S.) and Ecuador (Mus. S.-G.).

26. *GEOTHLYPIS VELATA* (Vieill.).

*Sylvia velata*, d'Orb. & Lafr. Syn. Av. i. p. 20; d'Orb. Voy. Ois. p. 217.

Prov. Chiquitos (*O.*).

We have not examined Bolivian specimens of this species.

27. *BASILEUTERUS VERMIVORUS* (Vieill.).

*Muscicapa vermivora*, d'Orb. & Lafr. Syn. Av. i. p. 51; d'Orb. Voy. Ois. p. 324.

*Basileuterus vermivorus*, Scl. P. Z. S. 1865, p. 283.

Between Santa Cruz de la Sierra and Chiquitos (*O.*).

Not seen by us from Bolivia, but quite likely to occur there, being widely distributed.

28. *BASILEUTERUS EUOPHRYS*, Scl. & Salv. P. Z. S. 1876, p. 352.Tilotilo (*B.*).29. *BASILEUTERUS BIVITTATUS* (d'Orb. & Lafr.).

*Muscicapa bivittata*, d'Orb. & Lafr. Syn. Av. i. p. 51.

*Muscicapara bivittata*, d'Orb. Voy. Ois. p. 324.

Carcuata, Prov. Yungas (*O.*); Simacu, Prov. Yungas (*B.*).

30. *BASILEUTERUS DIACHLORUS*, Cab. Journ. f. O. 1873, p. 316. Simacu, Consata (*B.*).31. *BASILEUTERUS MESOLEUCUS*, Scl. P. Z. S. 1865, p. 286, pl. 9. fig. 1.Yuyo (*B.*).

The single specimen sent by Mr. Buckley agrees with the type (Mus. P. L. S.), except in having the throat and breast rather more suffused with pale rufous. The rufous superciliary line is not shown; but this may be owing to the damaged state of Mr. Buckley's skin.

32. *SETOPHAGA VERTICALIS*, d'Orb. & Lafr. Syn. Av. i. p. 50; d'Orb. Voy. Ois. p. 330, t. xxxv. f. 1; Salvin, Ibis, 1878, p. 311.

Prov. Yungas (*O.*); Typuani, Prov. Yungas (*B.*).

33. *SETOPHAGA MELANOCEPHALA* (Tsch.); Salvin, Ibis, 1878, p. 312.Simacu, Tilotilo (*B.*).34. *SETOPHAGA BRUNNEICEPS*, d'Orb. & Lafr. Sgn. Av. i. p. 50; d'Orb. Voy. Ois. p. 329, t. xxxiv. f. 3, 4; Salvin, Ibis, 1878, p. 312.

Prov. Yungas (*O.*); Tilotilo, Prov. Yungas (*B.*).



## Fam. VIREONIDÆ.

## 35. VIREOSYLVA OLIVACEA (Linn.).

*Vireo virescens*, d'Orb. & Lafr. Syn. Av. i. p. 9.*Vireo olivaceus*, d'Orb. Voy. Ois. p. 162.

Moxos, Chiquitos, Yungas and Yuracares (O.); Guanai, Prov. Yungas (B.).

## 36. CYCLORHIS, sp. inc.

*Laniagra guyanensis*, d'Orb. & Lafr. Syn. Av. i. p. 9; d'Orb. Voy. Ois. p. 160.*Cyclorhis viridis*, Scl. Cat. Am. B. p. 46.

Chiquitos, Yungas, Ayupaya, and Rio Grande (O.).

A Bolivian *Cyclorhis* in Sclater's collection is certainly not *C. viridis* of the Argentine Republic, but comes nearest to *C. flavipectus*, although apparently different, having a much higher and more compressed bill, with a strong black patch at the base of the lower mandible.

## Fam. HIRUNDINIDÆ.

## 37. PROGNE PURPUREA (Linn.).

*Hirundo purpurea*, d'Orb. & Lafr. Syn. Av. i. p. 68.

Mizque, Guarayos, Chiquitos (O.).

## 38. PROGNE TAPERA (Linn.).

*Hirundo fusca*, d'Orb. & Lafr. Syn. Av. i. p. 68.*Progne tapera*, Scl. P. Z. S. 1872, p. 600.

Prov. Chiquitos (O.).

39. HIRUNDO ANDICOLA, d'Orb. &amp; Lafr. Syn. Av. i. p. 69; Scl. et Salv. P. Z. S. 1867, p. 984, et 1869, p. 151.

La Paz (O.).

## 40. HIRUNDO ALBIVENTRIS, Bodd.

*Hirundo leucoptera*, d'Orb. & Lafr. Syn. Av. i. p. 69.

Moxos (O.).

We have specimens of this Swallow from Eastern Peru; and it may doubtless occur in Bolivia.

## 41. ATTICORA FASCIATA (Gm.).

Yuyo, Cangali (B.); Prov. Yungas (O.).

This species appears to extend from Cayenne (Mus. P. L. S.), throughout Amazonia into Ecuador (Mus. P. L. S.) and Bolivia. The specimens from the last three localities have the white breast-band much broader than the Cayenne bird.

## 42. ATTICORA CYANOLEUCA (Vieill.).

*Hirundo cyanoleuca*, d'Orb. & Lafr. Syn. Av. i. p. 68.*Petrochelidon cyanoleuca*, Scl. Cat. Am. B. p. 40.

Prov. Moxos (O.); Cangali, Tilotilo, Prov. Yungas (B.).

43. *STELGIDOPTERYX RUFICOLLIS* (Vieill.).*Hirundo flavigaster*, d'Orb. & Lafr. Syn. Av. i. p. 69.

Yuyo (B.).

Bolivian specimens possibly belong to the Brazilian form, and not to the western *S. uropygialis* (Lawr.)<sup>1</sup>.

## Fam. CEREVIDÆ.

44. *DIGLOSSA SITTOIDES* (d'Orb. & Lafr.).*Servirostrum sittoides*, d'Orb. & Lafr. Syn. Av. ii. p. 25; d'Orb. Voy. Ois. p. 374, t. lviii. f. 3.*Diglossa sittoides*, Scl. Ibis, 1875, p. 208.

Chupé, Prov. Yungas, Chuquisaca and Valle Grande (O.).

45. *DIGLOSSA BRUNNEIVENTRIS*, Lafr.; Scl. Ibis, 1875, p. 211.

Tilotilo, Khapaguaia, Prov. Yungas (B.).

46. *DIGLOSSA MYSTACALIS*, Lafr.; Scl. Ibis, 1875, p. 212.

Cillutincara, Prov. Yungas (B.).

47. *DIGLOSSA CARBONARIA*, (d'Orb. & Lafr.).*Servirostrum carbonarium*, d'Orb. & Lafr. Syn. Av. ii. p. 24; d'Orb. Voy. Ois. p. 373, t. lviii. f. 1, 2.*Diglossa carbonaria*, Scl. Ibis, 1875, p. 213.

Cajapi, Prov. Yungas, Inquisivi, Prov. Sicasica, Palca, Prov. Ayupaya (O.); Tilotilo, Prov. Yungas (B.).

48. *DIGLOSSA GLAUCA*, Scl. & Salv. P. Z. S. 1876, p. 253.

Nairapi, Prov. Yungas (B.).

49. *DIGLOSSA PERSONATA*, (Fraser); Scl. Ibis, 1875, p. 218.

Tilotilo, Caguarani, Prov. Yungas (B.).

50. *CONIROSTRUM CYANEUM*, Tacz. P. Z. S. 1874, p. 312.

Tilotilo, Prov. Yungas (B.).

51. *CONIROSTRUM FERRUGINEIVENTRE*, Scl. P. Z. S. 1855, p. 74, Aves, pl. lxxxv.; Scl. & Salv. P. Z. S. 1874, pp. 511 et 678.

Sclater's original description of this species was based on specimens in the Derby Museum, collected by Bridges in Bolivia. Mr. Whitely and M. Jelski have both obtained it in Peru.

52. *CONIROSTRUM CINEREUM*, d'Orb. & Lafr. Syn. Av. ii. p. 25; d'Orb. Voy. Ois. p. 374, t. lix. f. 1.

Inquisivi, Prov. Sicasica (O.).

In Sclater's collection, from Bolivia (*D. Forbes*) and Peru (*Jelski*).<sup>1</sup> Ibis, 1863, p. 281.

53. CONIROSTRUM ATROCYANEUM, Lafr. Rev. Zool. 1848, p. 9.  
Tilotilo (B.).

This species is in our opinion quite distinct from *C. albifrons* of Colombia. Besides the blue head, the present bird differs in having the whole back except the upper tail-coverts of a dull black.

54. DACNIS CAYANA (Linn.).

*Dacnis cyanater*, d'Orb. & Lafr. Syn. Av. p. 21.

*Dacnis cyanocephalus*, d'Orb. Voy. Ois. p. 221.

*Dacnis cayana*, ScI. Ibis, 1863, p. 313.

Rio Tamapaya, Prov. Yungas, Santa Cruz de la Sierra, Territory of the Yuracares and Guarayos Indians (O.).

55. DACNIS ANGELICA, Bp.

*Dacnis cayanus*, d'Orb. & Lafr. Syn. Av. p. 20; d'Orb. Voy. Ois. p. 221.

*Dacnis melanotis* et *D. angelica*, ScI. Ibis, 1863, p. 315.

Territory of the Yuracares Indians (O.).

The name "*angelica*" having been published by Bonaparte in a footnote to his paper in the "Atti della sesta Riunione degli Scienziati Italiani" (p. 404) in 1845, takes precedence over Strickland's *melanotis* (Contr. Orn. 1851, p. 16) for this species.

56. DACNIS FLAVIVENTER, d'Orb. & Lafr. Syn. Av. i. p. 21; d'Orb. Voy. Ois. p. 220, t. xiii. f. 2; ScI. Ibis, 1863, p. 316.

Territory of the Yuracares Indians (O.).

57. CHLOROPHANES ATRICAPILLA (Vieill.).

*Cæreba atricapilla*, d'Orb. & Lafr. Syn. Av. ii. p. 24.

Territory of the Yuracares Indians (O.); Nairapi, Simacu, Prov. Yungas (B.).

58. CÆREBA CYANEA (Linn.); d'Orb. & Lafr. Syn. Av. ii. p. 34.

Territory of the Guarayos Indians (O.).

59. CÆREBA CÆRULEA (Linn.).

Tilotilo, Simacu, Nairapi, Prov. Yungas (B.).

60. CERTHIOLA MEXICANA, ScI.

*Certhiola flaveola*, d'Orb. & Lafr. Syn. Av. ii. p. 24.

*Certhiola mexicana*, Finsch, Verh. z.-b. Ges. Wien, 1871, p. 773.

Territory of the Guarayos Indians (O.); Tilotilo, Baganti, Prov. Yungas (B.).

#### Fam. TANAGRIDÆ.

61. PROCNIAS TERSA (Linn.).

*Tersina cærulea*, d'Orb. & Lafr. Syn. Av. i. p. 41.

*Tersina tersa*, d'Orb. Voy. Ois. p. 299.

Santa Cruz de la Sierra (O.); Tilotilo, Prov. Yungas (B.).

## 62. CHLOROPHONIA VIRIDIS (Vieill.).

Tilotilo, Prov. Yungas (B.).

The single female example sent cannot be distinguished from the corresponding sex of this species.

63. EUPHONIA LANIIROSTRIS, d'Orb. & Lafr. Syn. Av. i. p. 30; d'Orb. Voy. Ois. p. 266, t. xxii. f. 1.

*Euphonia crassirostris*, Scl. P. Z. S. 1856, p. 103 et aliter.

Prov. Yungas and Santa Cruz de la Sierra, Territory of the Yuracares and Guarayos Indians (O.).

After examining a large series, we think *E. crassirostris*, originally established on Colombia specimens, cannot be safely distinguished from the Bolivian bird.

## 64. EUPHONIA CHLOROTICA (Linn.).

*Euphonia serrirostris*, d'Orb. & Lafr. Syn. Av. i. p. 30; d'Orb. Voy. Ois. p. 267, t. xxi. fig. 2.

Guarayos (O.); Tilotilo, Prov. Yungas (B.).

65. EUPHONIA RUFICEPS, d'Orb. & Lafr. Syn. Av. i. p. 30; d'Orb. Voy. Ois. p. 268, t. xxii. f. 2.

Territory of the Yuracares Indians (O.); Tilotilo, Prov. Yungas (B.).

## 66. EUPHONIA CHRYSOPASTA, Scl. &amp; Salv.

*Euphonia chrysopasta*, Scl. & Salv. P. Z. S. 1868, p. 438, pl. xxx. Simacu (B.).

## 67. PIPRIDEA MELANONOTA (Vieill.).

Tilotilo, Prov. Yungas (B.).

68. PIPRIDEA CASTANEIVENTRIS, Scl. P. Z. S. 1866, p. 265.

Tilotilo, Prov. Yungas (B.).

## 69. CALLISTE YENI (d'Orb. &amp; Lafr.).

*Aglaia yeni*, d'Orb. & Lafr. Syn. Av. i. p. 270.

*Tanagra yeni*, d'Orb. Voy. Ois. p. 270, t. xxiv. f. 2.

Typuani, Tilotilo, Prov. Yungas (B.); Yungas and Yuracares (O.).

## 70. CALLISTE SCHRANKI (d'Orb. &amp; Lafr.).

*Aglaia schranki*, d'Orb. & Lafr. Syn. Av. i. p. 270; d'Orb. Voy. Ois. p. 270, t. xxiv. f. i.

Territory of the Yuracares Indians (O.); Nairapi, Tilotilo, Prov. Yungas (B.).

71. CALLISTE PUNCTULATA, Scl. & Salv. P. Z. S. 1876, p. 353.

Tilotilo, Prov. Yungas (B.).

## 72. CALLISTE PULCHRA (Tsch.).

Tilotilo, Prov. Yungas (B.).

73. *CALLISTE GYROLOIDES* (Lafr.).*Aglaia gyrola*, d'Orb. & Lafr. Syn. Av. i. p. 32.*Tanagra gyrola*, d'Orb. Voy. Ois. p. 272.*Calliste gyroloides*, Scl. P. Z. S. 1856, p. 255.

Territory of the Yuracares and Guarayos Indians (O.).

74. *CALLISTE BOLIVIANA*, Bp.*Aglaia mexicana*, d'Orb. & Lafr. Syn. Av. i. p. 32.*Tanagra flaviventris*, d'Orb. Voy. Ois. p. 271.*Calliste boliviana*, Scl. P. Z. S. 1856, p. 258.

Territory of the Yuracares and Guarayos Indians (O.).

75. *CALLISTE ATROCÆRULEA* (Tsch.).

Nairapi, Tilotilo, Prov. Yungas (B.).

76. *CALLISTE FULVICERVIX*, Scl. & Salv. P. Z. S. 1876, p. 354, pl. xxx. fig. 1.

Tilotilo, Prov. Yungas (B.).

77. *CALLISTE ARGYROPHENGES*, Scl. & Salv. P. Z. S. 1876, p. 354, pl. xxx. fig. 2.

Tilotilo, Prov. Yungas (B.).

78. *CALLISTE NIGRICINCTA* (Bp.).

Mapiri, Prov. Yungas (B.).

79. *CALLISTE CYANEICOLLIS* (d'Orb. & Lafr.).*Aglaia cyaneicollis*, d'Orb. & Lafr. Syn. Av. i. p. 33.*Tanagra cyaneicollis*, d'Orb. Voy. Ois. p. 271, t. xxv. f. 1.

Territory of the Yuracares Indians (O.); Ramosani, Tilotilo, Prov. Yungas (B.).

80. *CALLISTE CYANOTIS*, Scl.*Calliste cyanotis*, Scl. P. Z. S. 1858, p. 294, et Ibis, 1876, p. 408, pl. xii. fig. 2.

Tilotilo, Prov. Yungas (B.).

81. *CALLISTE XANTHOCEPHALA* (Tsch.).*Calliste lamprotis*, Scl. Contr. Orn. 1851, p. 65.*Calliste xanthocephala*, Scl. P. Z. S. 1856, p. 264.

Juanani, Tilotilo, Prov. Yungas (B.).

*C. lamprotis* was established on a Bolivian example of this species in the British Museum obtained by Mr. Bridges. Subsequent researches showed it to be the same as *C. xanthocephala* (Tsch.).82. *IRIDORNIS JELSKII*, Cab. J. f. Orn. 1873, p. 316; Tacz. P. Z. S. 1874, p. 514.

Tilotilo, Prov. Yungas (O.).

83. *PÆCILOTHRAUPIS IGNIVENTRIS* (d'Orb. & Lafr.).*Aglaiia igniventris*, d'Orb. & Lafr. Syn. Av. i. p. 32.*Tanager igniventris*, d'Orb. Voy. Ois. p. 275, t. xxv. f. 2.

Prov. Apolobamba (O.); Tilotilo, Prov. Yungas (B.).

84. *BUTHRAUPIS MONTANA* (d'Orb. & Lafr.).*Aglaiia montana*, d'Orb. & Lafr. Syn. Av. i. p. 32.*Tanager montana*, d'Orb. Voy. Ois. p. 275, t. xxiii. f. 1.

Carcuata, Prov. Yungas (O.); Ramosani, Tilotilo, Prov. Yungas (B.).

85. *COMPSOCOMA FLAVINUCHA* (d'Orb. & Lafr.).*Tachyphonus flavinucha*, d'Orb. & Lafr. Syn. Av. i. p. 29; d'Orb. Voy. Ois. p. 279, t. xxi. f. 1.

Chupé, Irupana, Suri, Prov. Yungas (O.); Simacu, Tilotilo, Prov. Yungas (B.).

86. *TANAGRA PALMARUM*, Max.*Aglaiia olivascens*, d'Orb. & Lafr. Syn. Av. i. p. 33.*Tanager olivascens*, d'Orb. Voy. Ois. p. 274.*Tanager palmarum*, Scl. Cat. Am. B. p. 76.

Cangalli, Prov. Yungas (B.).

Prov. Santa Cruz de la Sierra and Territory of the Yuracares and Guarayos Indians (O.).

87. *TANAGRA SAYACA*, Linn.*Tanager sayaca*, Linn. S. N. i. p. 316.*Aglaiia episcopus*, d'Orb. & Lafr. Syn. Av. i. p. 33.*Tanager episcopus*, d'Orb. Voy. Ois. p. 274, t. xxii. f. 3.*Thraupis sayaca*, Cab. Mus. Hein. i. p. 28.

Cochabamba, Valle Grande, Yungas (O.); Sorata, Prov. Yungas (B.).

88. *TANAGRA DARWINI*, Bp.; Scl. Cat. A. B. p. 76.

Sorata, Tilotilo, Prov. Yungas (B.).

89. *TANAGRA STRIATA* (Gm.).*Aglaiia striata*, d'Orb. & Lafr. Syn. Av. i. p. 32.*Tanager striata*, d'Orb. Voy. Ois. p. 273, t. lxii. f. 3.

La Paz (O.); Cinti (B.).

90. *TANAGRA CYANOCEPHALA* (d'Orb. & Lafr.).*Aglaiia cyanocephala*, d'Orb. & Lafr. Syn. Av. i. p. 32.*Tanager maximiliani*, d'Orb. Voy. Ois. p. 276, t. xxiii. f. 2.

Cochabamba, Inquisivi, Prov. Sicasica (O.); Ramosani, Tilotilo, Prov. Yungas (B.).

91. *RHAMPHOCELUS ATROSERICEUS*, d'Orb. & Lafr. Syn. Av. i.

p. 34 ; d'Orb. Voy. Ois. p. 280, t. xxvi. f. i. ; ScL. Cat. Am. B. p. 79.

Chupé, Prov. Yungas ; Prov. Moxos and Chiquitos, and Territory of the Yuracares and Guarayos Indians (O.). Ramosani, Prov. Yungas (B.).

92. PYRANGA RUBRA (Linn.).

Pillon, Prov. Yungas (B.).

93. PYRANGA AZARÆ (d'Orb.).

*Pyranga mississippiensis*, d'Orb. & Lafr. Syn. Av. i. p. 33.

*Pyranga azaræ*, d'Orb. Voy. Ois. p. 264.

Prov. Chiquitos, Yungas, Valle Grande (O.) ; Cangalli, Cinti (B.).

This Bolivian form is very closely allied to our *P. testacea* of Central America, but brighter beneath, and is quite distinct from *P. saira* of Brazil.

94. PHENICOTHAUPIS RUBICA (d'Orb. & Lafr.).

*Saltator rubicus*, d'Orb. & Lafr. Syn. Av. i. p. 36.

*Pyranga rubica*, d'Orb. Voy. Ois. p. 265.

Territory of the Yuracares and Guarayos Indians (O.).

95. LANIO VERSICOLOR (d'Orb. & Lafr.).

*Tachyphonus versicolor*, d'Orb. & Lafr. Syn. Av. i. p. 28.

*Pyranga versicolor*, d'Orb. Voy. Ois. p. 262, t. xix. f. 1.

Territory of the Yuracares Indians (O.).

96. MALACOTHAUPIS DENTATA, ScL. & Salv. P. Z. S. 1876, p. 354.

Tilotilo (B.).

97. EUCOMETIS ALBICOLLIS (d'Orb. & Lafr.).

*Pyranga albicollis*, d'Orb. & Lafr. Syn. Av. i. p. 33 ; d'Orb. Voy. Ois. p. 265, t. xxvi. f. 2.

*Eucometis albicollis*, ScL. Cat. Am. B. p. 84.

Mission de Santa Ana, Prov. Chiquitos (O.).

98. TACHYPHONUS LUCTUOSUS, d'Orb. & Lafr. Syn. Av. i. p. 29.

*Pyranga luctuosa*, d'Orb. Voy. Ois. p. 263, t. xx. f. 12 ; ScL. Cat. Ann. B. p. 85.

Territory of the Yuracares and Guarayos Indians (O.).

99. TACHYPHONUS RUFIVENTRIS (Spix).

Nairapi, Prov. Yungas (B.).

100. CYPHNAGRA RUFICOLLIS (Licht.).

*Tachyphonus ruficollis*, d'Orb. & Lafr. Syn. Av. i. p. 29 ; d'Orb. Voy. Ois. p. 277.

Missions de Concepcion and de Santiago, Prov. Chiquitos (O.).

101. NEMOSIA PILEATA (Bodd.); d'Orb. & Lafr. Syn. Av. i. p. 28; d'Orb. Voy. Ois. p. 261.

San Miguel and San Jose, Prov. Chiquitos (O.).

102. NEMOSIA GUIRA (Linn.).

*Nemosia nigricollis*, d'Orb. & Lafr. Syn. Av. i. p. 27; d'Orb. Voy. Ois. p. 260.

*Nemosia guirina*, Scl. Cat. Am. B. p. 87.

Rio Tarnampaya, Prov. Yungas, San Xavier, Prov. Chiquitos, and Territory of the Yuracares and Guarayos Indians (O.); Caguarani, Prov. Yungas (B.).

103. NEMOSIA FLAVICOLLIS (Vieill.).

Simacu, Prov. Yungas (B.).

104. NEMOSIA RUFICEPS (d'Orb. & Lafr.).

*Sylvia ruficeps*, d'Orb. & Lafr. Syn. Av. i. p. 20.

*Hylophilus ruficeps*, d'Orb. Voy. Ois. p. 219, t. xiii. f. 1.

Palca, Prov. Ayupaya (O.); Sorata, Tilotilo, Prov. Yungas (B.). S. Baldomero, Bolivia (*Forbes* in Mus. P. L. S.).

105. NEMOSIA SORDIDA, d'Orb. & Lafr. Syn. Av. i. p. 28; d'Orb. Voy. Ois. p. 261, t. xviii. f. 2.

Territory of the Yuracares Indians (O.).

106. CHLOROSPINGUS ALBITEMPORALIS (Lafr.).

Sorata, Nairapi, Tilotilo, Prov. Yungas (B.).

107. CHLOROSPINGUS FLAVIGULARIS, Scl. Cat. Am. B. p. 89.

Simacu, Prov. Yungas (B.).

108. CHLOROSPINGUS CALOPHRYS, Scl. & Salv. P. Z. S. 1876, p. 354.

Tilotilo, Prov. Yungas (B.).

109. CHLOROSPINGUS CASTANEICOLLIS, Scl. P. Z. S. 1858, p. 293.

Ramosani, Tilotilo, Prov. Yungas (B.).

110. MICROSPINGUS TRIFASCIATUS, Tacz. P. Z. S. 1874, p. 132 et p. 517.

Tilotilo, Prov. Yungas (B.).

111. BUARREMON TORQUATUS (d'Orb. & Lafr.).

*Embernagra torquata*, d'Orb. & Lafr. Syn. Av. i. p. 34.

*Arremon affinis*, d'Orb. Voy. Ois. p. 282, t. xxvii. f. 1.

Carcuata, Prov. Yungas (O.); Ramosani, Tilotilo, Prov. Yungas (B.).



## 112. BUARREMON MELANOPS, Scl. &amp; Salv.

*Buarremon rufinuchus*, Scl. Cat. Am. B. p. 91 (nec d'Orb. & Lafr.).

*Buarremon melanops*, Scl. & Salv. P. Z. S. 1876, p. 253.

Simacu, Prov. Yungas (O.).

## 113. BUARREMON RUFINUCHA (d'Orb. &amp; Lafr.).

*Embernagra rufinucha*, d'Orb. & Lafr. Syn. Av. i. p. 35.

*Arremon rufinucha*, d'Orb. Voy. Ois. p. 283, t. xxviii. f. 2.

Yanacaché and Carcuata, Prov. Yungas (O.); Tilotilo, Prov. Yungas (B.).

## 114. BUARREMON FULVICEPS (d'Orb. &amp; Lafr.).

*Emberiza fulviceps*, d'Orb. & Lafr. Syn. Av. i. p. 77; d'Orb. Voy. Ois. p. 363, t. xlv. f. 2.

Totora, Prov. Mizque (O.); Tilotilo, Prov. Yungas (B.).

This is a true *Buarremon*, allied to *B. semirufus*, but distinguished by its yellow throat and breast.

## 115. ARREMON ORBIGNII, Scl.

*Embernagra silens*, d'Orb. & Lafr. Syn. Av. i. p. 34.

*Arremon silens*, d'Orb. Voy. Ois. p. 281.

*Arremon d'orbignii*, Scl. P. Z. S. 1856, p. 81.

Prov. Yungas, Chiquitos, and Valle Grande (O.).

## 116. CISSOPIS MINOR, Tsch.

*Saltator bicolor*, d'Orb. & Lafr. Syn. Av. i. p. 36.

*Bethylus picatus*, d'Orb. Voy. Ois. p. 269.

Cochabamba and Territory of the Yuracares Indians (O.).

We have not yet seen Bolivian skins of this species, but suppose that the Bolivian would be the same as the Peruvian form.

## 117. PSITTOSPIZA ELEGANS (Tsch.).

*Psittospiza elegans*, Tacz. P. Z. S. 1874, p. 519.

Tilotilo, Prov. Yungas (B.).

## 118. SALTATOR MAGNUS (Gm.).

Mirkimarca, Tilotilo, Prov. Yungas (B.).

## 119. SALTATOR CÆRULESCENS, Vieill.; d'Orb. &amp; Lafr. Syn. Av. i. p. 35; d'Orb. Voy. Ois. p. 287, t. xxviii. f. 4, t. liv. f. 4.

Santa Cruz (O.).

## 120. SALTATOR RUFIVENTRIS, d'Orb. &amp; Lafr. Syn. Av. i. p. 35; d'Orb. Voy. Ois. p. 289, t. xviii. f. 2.

Inquisivi, Prov. Sicasica; Palca, Prov. Ayupaya (O.).

## 121. SALTATOR LATICLAVIUS, Scl. &amp; Salv. P. Z. S. 1869, p. 151.

*Saltator aurantiurostris*, d'Orb. & Lafr. Syn. Av. i. p. 35; d'Orb. Voy. Ois. p. 288, t. xxviii. f. 3 (partim).

Sorata, Tilotilo, Prov. Yungas (B.).

122. *SALTATOR ATRICOLLIS* (Vieill.).*Saltator validus*, d'Orb. & Lafr. Syn. Av. i. p. 35.*Saltator atricollis*, d'Orb. Voy. Ois. p. 288.

Santa Ana, Prov. Chiquitos (O.).

123. *ORCHESTICUS ATER* (Gm.).*Saltator atra*, d'Orb. & Lafr. Syn. Av. i. p. 36.*Saltator melanopsis*, d'Orb. Voy. Ois. p. 291.

Ramosani, Prov. Yungas (B.).

## Fam. FRINGILLIDÆ.

124. *PHEUCTICUS AUREIVENTRIS* (d'Orb. & Lafr.).*Pitylus aureiventris*, d'Orb. & Lafr. Syn. Av. i. p. 84; d'Orb. Voy. Ois. p. 365.*Pheucticus aureiventris*, Scl. Cat. Am. B. p. 99.

Prov. Yuncas, Ayupaya, Sicasica, Mizqué, Chuquisaca, Chiquitos (O.).

125. *GUIRACA CYANEA* (Linn.).*Pitylus cyaneus*, d'Orb. & Lafr. Syn. Av. i. p. 84.

Chiquitos (O.).

126. *ORYZOBORUS TORRIDUS* (Gm.).*Pitylus torridus*, d'Orb. & Lafr. Syn. Av. i. p. 85.

Prov. Chiquitos (O.).

127. *SPERMOPHILA HYPOXANTHA*, Cab.*Pyrrhula minuta*, d'Orb. & Lafr. Syn. Av. i. p. 87.*Spermophila hypoxantha*, Scl. Ibis, 1871, p. 3.

Chiquitos (O.).

128. *SPERMOPHILA NIGRORUFA* (d'Orb. et Lafr.).*Pyrrhula nigrorufa*, d'Orb. & Lafr. Syn. Av. i. p. 88.*Spermophila nigrorufa*, Scl. Ibis, 1871, p. 6.

Chiquitos (O.).

129. *SPERMOPHILA COLLARIA* (Linn.).*Pyrrhula melanocephala*, d'Orb. & Lafr. Syn. Av. i. p. 85.*Spermophila collaria*, Scl. Ibis, 1871, p. 9.

Prov. Moxos, Territory of the Guarayos Indians (O.).

130. *SPERMOPHILA CÆRULESCENS* (Vieill.).*Pyrrhula ornata*, d'Orb. & Lafr. Syn. Av. i. p. 86.*Spermophila cærulescens*, Scl. Ibis, 1871, p. 12.

Simacu, Prov. Yungas (B.); Prov. Yungas (O.).

131. *SPERMOPHILA LINEOLA* (Linn.).*Pyrrhula lineola*, d'Orb. & Lafr. Syn. Av. i. p. 86.*Spermophila lineola*, Scl. Ibis, 1871, p. 13.

Chiquitos, Guarayos (O.).

132. SPERMOPHILA LUCTUOSA (Lafr.),  
*Spermophila luctuosa*, Scl. Ibis, 1871, p. 15.  
Simacu, Prov. Yungas (B.).
133. SPERMOPHILA BICOLOR (d'Orb. & Lafr.).  
*Pyrrhula bicolor*, d'Orb. & Lafr. Syn. Av. i. p. 86.  
*Spermophila bicolor*, Scl. Cat. Am. B. p. 103, et Ibis, 1871,  
p. 17.  
Moxos (O.).
134. SPERMOPHILA PLUMBEA (Max.).  
*Pyrrhula cinerea*, d'Orb. & Lafr. Syn. Av. i. p. 87.  
*Spermophila plumbea*, Scl. Ibis, 1871, p. 19.  
Chiquitos (O.).
135. VOLATINIA JACARINA (Linn.).  
*Emberiza jacarini*, d'Orb. & Lafr. Syn. Av. i. p. 81.  
Santa Cruz de la Sierra (O.); Consata, Tilotilo, Prov. Yungas (B.).
136. PAROARIA CERVICALIS, Scl. Cat. Am. B. p. 108.  
The type of this species remains unique in Selater's collection.  
It was obtained, along with a lot of other birds mostly, if not all,  
from Bolivia, of a London dealer in 1853.
137. CORYPHOSPINGUS CRISTATUS (Gm.).  
*Emberiza araguira*, d'Orb. & Lafr. Syn. Av. i. p. 81.  
*Coryphospingus cristatus*, Scl. Cat. Am. B. p. 109.  
Tilotilo, Prov. Yungas (B.); Prov. Yungas, Chiquitos (O.).
138. CORYPHOSPINGUS GRISEO-CRISTATUS (d'Orb. & Lafr.).  
*Emberiza griseo-cristata*, d'Orb. & Lafr. Syn. Av. i. p. 79;  
d'Orb. Voy. Ois. p. 363, t. xlvii. f. 1.  
*Coryphospingus griseocristatus*, Scl. Cat. Am. B. p. 109.  
Cochabamba, Mizqué, Valle Grande (O.); Tilotilo, Prov. Yungas  
(B.).
139. POOSPIZA TORQUATA (d'Orb. & Lafr.).  
*Emberiza torquata*, d'Orb. & Lafr. Syn. Av. i. p. 82.  
*Poospiza torquata*, Scl. Cat. Am. B. p. 110.  
Sicasica (O.); Tilotilo, Prov. Yungas (B.).
140. POOSPIZA HYPOCHONDRIACA (d'Orb. & Lafr.).  
*Emberiza hypochondriaca*, d'Orb. & Lafr. Syn. Av. i. p. 80;  
d'Orb. Voy. Ois. p. 361, t. xlv. f. 1.  
Tilotilo, Prov. Yungas (B.). Inquisivi, Prov. Sicasica, Palca,  
Prov. Ayupaya (O.).
141. POOSPIZA MELANOLEUCA (Vieill.).  
*Emberiza melanoleuca*, d'Orb. & Lafr. Syn. Av. i. p. 82.  
Chiquitos (O.).

## 142. PHRYGILUS CANICEPS, Burm.

*Emberiza gayi* (stirps major), d'Orb. & Lafr. Syn. Av. i. p. 75.*Phrygillus caniceps*, Scl. & Salv. Ibis, 1878, p. 393.

La Paz (O.); Tilotilo (B.).

## 143. PHRYGILUS ATRICEPS (d'Orb. &amp; Lafr.).

*Emberiza atriceps*, d'Orb. & Lafr. Syn. Av. i. p. 76; d'Orb. Voy. Ois. p. 363, t. xlvii. f. 2.

Oruro and Potosi (O.).

## 144. PHRYGILUS UNICOLOR (d'Orb. &amp; Lafr.).

*Emberiza unicolor*, d'Orb. & Lafr. Syn. Av. i. p. 79.*Phrygillus unicolor*, Scl. Cat. Am. B. p. 111.*Emberiza guttata*, d'Orb. & Lafr. Syn. Av. i. p. 78 (♀).

Pampa de Oruro and Sicasica (O.).

Mus. P. L. S. ex Bolivia (Bridges et D. Forbes).

## 145. PHRYGILUS FRUTICETI (Kittl.).

*Emberiza luctuosa*, d'Orb. & Lafr. Syn. Av. i. p. 80.*Phrygillus fruticeti*, Scl. Cat. Am. B. p. 111.

La Paz (O.); Tilotilo, Prov. Yungas (B.).

## 146. DIUCA SPECULIFERA (d'Orb. &amp; Lafr.).

*Emberiza speculifera*, d'Orb. & Lafr. Syn. Av. i. p. 78; d'Orb. Voy. Ois. p. 362, t. xlv. f. 1.*Diuca speculifera*, Scl. Cat. Am. B. p. 111.

Prov. Yungas, and Palca, Prov. Ayupaya (O.).

## 147. CATAMENIA ANALIS (d'Orb. &amp; Lafr.).

*Linaria analis*, d'Orb. & Lafr. Syn. Av. i. p. 83; d'Orb. Voy. Ois. p. 364, t. xlviii. f. 1.*Catamenia analis*, Scl. Cat. Am. B. p. 105.

Sorato, Prov. Yungas (B.); La Paz, Inquisivi, Cochabamba, Totora and Chuquisaca (O.).

## 148. ZONOTRICHIA PILEATA (Bodd.).

*Emberiza matutina*, d'Orb. & Lafr. Syn. Av. i. p. 80.*Zonotrichia pileata*, Scl. Cat. A. B. p. 113.

Bolivia (O.); Sorata, Nairapi, Prov. Yungas (B.).

## 149. COTURNICULUS PERUANUS, Bp.

*Emberiza mainimbe*, d'Orb. & Lafr. Syn. Av. i. p. 77.*Coturniculus peruanus*, Scl. Cat. Am. B. p. 117.

Santa Cruz (O.).

## 150. EMBERNAGRA OLIVASCENS, d'Orb. Voy. Ois. p. 285.

Inquisivi, Prov. Sicasica, Palca, Prov. Ayupaya, Cochabamba (O); Tilotilo, Prov. Yungas (B.).

151. *EMBERIZOIDES SPHENURUS* (Vieill.); Scl. Cat. Am. B. p. 118.

An example of this species in Sclater's collection, obtained through Cuming in 1854, is believed to have been collected in Bolivia by Bridges.

152. *CHRYSMITRIS MAGELLANICA* (Vieill.).

*Carduelis magellanicus*, d'Orb. & Lafr. Syn. Av. i. p. 83.

*Chrysomitris barbata*, Scl. Cat. Am. B. p. 125.

Prov. Chiquitos, (O.).

153. *CHRYSMITRIS ATRATA* (d'Orb. & Lafr.).

*Carduelis atratus*, d'Orb. & Lafr. Syn. Av. i. p. 83; d'Orb. Voy. Ois. p. 364, t. xlviii. f. 2.

*Chrysomitris atrata*, Scl. Cat. Am. B. p. 125.

La Paz (O.).

Mus. P. L. S. ex Bolivia (*Bridges*).

154. *CHRYSMITRIS XANTHOGASTRA* (Du Bus).

*Chrysomitris xanthogastra*, Scl. & Salv. P. Z. S. 1870, p. 785.

Sorata, Nairapi, Prov. Yungas (B.).

Bolivia (*Forbes* in Mus. P. L. S.).

155. *SYCALIS FLAVEOLA* (Linn.).

*Emberiza brasiliensis*, d'Orb. & Lafr. Syn. Av. i. p. 73.

*Sycalis flaveola*, Scl. Ibis, 1872, p. 41.

Santa Cruz de la Sierra (O.).

156. *SYCALIS LUTEOLA* (Sparrm.).

*Sycalis luteola*, Scl. Ibis, 1872, p. 44.

Tilotilo, Prov. Yungas (B.).

157. *SYCALIS LUTEA* (d'Orb. & Lafr.).

*Emberiza lutea*, d'Orb. & Lafr. Syn. Av. i. p. 74.

*Sycalis lutea*, Scl. Ibis, 1872, p. 46, pl. ii. fig. 2.

*Crithagra chloropsis*, Bp. Consp. i. p. 46.

Andes of Bolivia (O.).

Prince Bonaparte's *Crithagra chloropsis* was founded on Bolivian specimens of this species obtained by Pentland.

158. *SYCALIS LUTEOCEPHALA* (d'Orb. & Lafr.).

*Emberiza luteocephala*, d'Orb. & Lafr. Syn. Av. i. p. 74; d'Orb. Voy. Ois. p. 360, t. xlv. f. 2.

*Sycalis luteocephala*, Scl. Ibis, 1872, p. 46.

Cochabamba, Valle Grande, Chuquisaca (O.).

## Fam. ICTERIDÆ.

## 159. OSTINOPS YURACARIUM (d'Orb. &amp; Lafr.).

*Cassicus yuracares*, d'Orb. & Lafr. Syn. Av. ii. p. 2; d'Orb. Voy. Ois. p. 365, t. li. f. 1.

Territory of the Yuracares Indians, Prov. Cochabamba (O.).

## 160. OSTINOPS CRISTATUS (Gm.).

*Cassicus cristatus*, d'Orb. & Lafr. Syn. Av. ii. p. 2.

Prov. Yungas (O.); Tilotilo, Prov. Yungas (B.).

## 161. OSTINOPS ATROVIRENS (d'Orb. &amp; Lafr.).

*Cassicus atrovirens*, d'Orb. & Lafr. Syn. Av. ii. p. 1; d'Orb. Voy. Ois. p. 366, t. li. f. 2.

Yanacaché, Chulumani, Irupana, Cajuata, Prov. Yungas (O.); Simacu, Tilotilo, Prov. Yungas (B.).

## 162. CASSICUS PERSICUS (Linn.).

*Cassicus icteronotus*, d'Orb. & Lafr. Syn. Av. ii. p. 3.

*Cassiculus flavicrissus*, Scl. Cat. Am. B. p. 129 (partim).

Prov. Chiquitos (O.); Mapiri, Prov. Yungas (B.).

## 163. CASSICUS CHRYSONOTUS, d'Orb. &amp; Lafr. Syn. Av. ii. p. 3; d'Orb. Voy. Ois. p. 367, t. lii. f. 1.

Ramosani, Tilotilo, Prov. Yungas (B.); Charapaccé, Prov. Yungas, Morochata, Prov. Ayupaya (O.).

## 164. CASSICUS SOLITARIUS (Vieill.); d'Orb. &amp; Lafr. Syn. Av. ii. p. 3; Scl. Cat. Am. B. p. 130.

Territory of the Yuracares Indians (O.).

## 165. ICTERUS PYRRHOPTERUS (Vieill.); Scl. Cat. Am. B. p. 131.

Tilotilo, Prov. Yungas (B.).

Obtained by d'Orbigny at Corrientes.

## 166. ICTERUS CROCONOTUS, Wagl.; Scl. Cat. Am. B. p. 133.

*Icterus jamaicensis*, d'Orb. & Lafr. Syn. Av. ii. p. 6.

Santa Cruz (O.).

## 167. MOLOTHRUS BADIUS (Vieill.).

*Icterus badius*, d'Orb. & Lafr. Syn. Av. ii. p. 7.

Cochabamba, Sicasica (O.); Tilotilo, Prov. Yungas (B.).

## 168. LEISTES SUPERCILIARIS, Bp.

*Icterus militaris*, d'Orb. & Lafr. Syn. Av. ii. p. 4.

*Leistes superciliaris*, Scl. Cat. Am. B. p. 138.

Santa Cruz, Chiquitos (O.).

## Fam. CORVIDÆ.

## 169. CYANOCITTA VIRIDICYANEA (d'Orb. &amp; Lafr.).

*Garrulus viridicyaneus*, d'Orb. & Lafr. Syn. Av. ii. p. 9; d'Orb. Voy. Ois. p. 368, t. liii. f. 1.

Cajapi, La Paz (O.); Ramosani, Tilotilo, Prov. Yungas (B.).

## 170. CYANOCORAX INCAS (Bodd.).

*Garrulus peruvianus*, d'Orb. & Lafr. Syn. Av. ii. p. 9.

*Xanthura incas*, ScL. Ibis, 1879, p. 89.

Apolobamba (O.); Tilotilo, Prov. Yungas (B.).

## 171. CYANOCORAX CHRYSOPS (Vieill.).

*Garrulus chrysops*, d'Orb. & Lafr. Syn. Av. ii. p. 9.

*Cyanocorax chrysops*, Sharpe, Cat. B. iii. p. 120.

Prov. Chiquitos (O.); Cinti (B.).

## 172. CYANOCORAX CYANOMELAS (Vieill.).

*Pica cyanomelas*, Vieill. (ex Azara).

*Garrulus cyanomelas*, d'Orb. & Lafr. Syn. Av. ii. p. 9.

*Cyanocorax nigriceps*, ScL. & Salv. P. Z. S. 1876, p. 354.

*Cyanocorax chilensis*, Sharpe, Cat. B. iv. p. 125.

Tilotilo, Prov. Yungas (B.).

Since we have distinguished the Bolivian form of this species as *C. nigriceps* we have had an opportunity of examining a skin from Corrientes, which, there can be no doubt, is identical with the Paraguayan form (i. e. *cyanomelas*, Vieill. ex Azara). The result is that the Bolivian bird, if not precisely similar to the Corrientes form, is much too near to be separated from it, and that the S. Brazilian form (*C. cyanomelas*, Sharpe), will require a new name, if it is to be kept distinct.

It is possible that Bonaparte's *Psilorhinus chilensis* may, as Mr. Sharpe conjectured, have been based on an example of this species; but this name ought not to have been adopted, for two reasons: (1) the diagnosis is altogether insufficient; (2) the locality implied in the name is erroneous.

## Fam. TYRANNIDÆ.

## 173. AGRIORNIS LIVIDA (Kittl.).

*Pepoaza gutturalis*, d'Orb. & Lafr. Syn. Av. i. p. 351.

*Pepoaza andecola*, d'Orb. Voy. Ois. p. 351.

*Agriornis livida*, ScL. Cat. Am. B. p. 196.

Plateau of the Andes (O.).

## 174. AGRIORNIS MARITIMA (d'Orb. &amp; Lafr.).

*Pepoaza maritima*, d'Orb. & Lafr. Syn. Av. i. p. 65; d'Orb. Voy. Ois. p. 353.

Cobija and desert of Atacama (O.).

175. *AGRIORNIS INSOLENS*, Scl. et Salv. P. Z. S. 1869, p. 153.  
Sorata, Prov. Yungas (B.).

176. *MYIOTHERETES STRIATICOLLIS*, Scl.

*Tyrannus rufiventris*, d'Orb. & Lafr. Syn. Av. i. p. 45; d'Orb. Voy. Ois. p. 312, t. xxxii. f. 3, 4.

*Tænioptera striaticollis*, Scl. P. Z. S. 1851, p. 193, pl. xlii.

*Myiotheretes striaticollis*, Scl. Cat. A. B. p. 197.

Sorata, Tilotilo, Prov. Yungas (B.); Rio Miguella, Prov. Yungas, (O.).

177. *TÆNIOPTERA NENGETA* (Linn.).

*Pepoaza polyglotta*, d'Orb. & Lafr. Syn. Av. i. p. 62; d'Orb. Voy. Ois. p. 346, t. xxxix. f. 4.

*Tænioptera nengeta*, Scl. Cat. A. B. p. 197.

Prov. Chiquitos (O.).

178. *TÆNIOPTERA VELATA* (d'Orb. & Lafr.).

*Pepoaza velata*, d'Orb. & Lafr. Syn. Av. i. p. 62; d'Orb. Voy. Ois. p. 347.

*Tænioptera velata*, Scl. Cat. Am. B. p. 197.

Environs of Santa Cruz de la Sierra (O.).

179. *TÆNIOPTERA IRUPERO* (Vieill.).

*Pepoaza nivea*, d'Orb. & Lafr. Syn. Av. i. p. 62.

*Pepoaza irupero*, d'Orb. Voy. Ois. p. 348.

*Tænioptera irupero*, Scl. Cat. Am. B. p. 198.

Prov. Chiquitos (O.).

180. *OCHTHODIÆTA FUSCO-RUFUS*, Scl. & Salv. P. Z. S. 1876, p. 354.

Tilotilo, Prov. Yungas (B.).

181. *OCHTHÆCA CENANTHOIDES* (d'Orb. & Lafr.).

*Fluricola cenanthoides*, d'Orb. & Lafr. Syn. Av. i. p. 60; d'Orb. Voy. Ois. p. 344, t. xxxiii. f. 2.

Valley of La Paz (O.); Mapiri, Prov. Yungas (B.).

182. *OCHTHÆCA LEUCOPHRYS* (d'Orb. & Lafr.).

*Fluricola leucophrys*, d'Orb. & Lafr. Syn. Av. i. p. 60; d'Orb. Voy. Ois. p. 345, t. xxxvii. f. 1.

La Paz and Inquisivi, Prov. Sicasica (O.); Tilotilo, Prov. Yungas (B.).

183. *OCHTHÆCA PULCHELLA*, Scl. & Salv. P. Z. S. 1876, p. 355

Tilotilo, Prov. Yungas (B.).



184. *OCHTHÆCA RUFIPECTORALIS* (d'Orb. & Lafr.).

*Fluvicola rufipectoralis*, d'Orb. & Lafr. Syn. Av. i. p. 60; d'Orb. Voy. Ois. p. 345, t. xxxvii. f. 2.

Palca, Prov. Ayupaya (O.); Ramosani, Tilotilo, Prov. Yungas (B.).

185. *OCHTHÆCA THORACICA*, Tacz. P. Z. S. 1864, p. 133.

Tilotilo, Prov. Yungas (B.).

186. *OCHTHÆCA SETOPHAGOIDES* (Bp.).

*Muscicapa leucophrys*, d'Orb. & Lafr. Syn. Av. i. p. 53.

*Muscicapara leucophrys*, d'Orb. Voy. p. 327.

Bolivia (O.); Tilotilo, Prov. Yungas (B.).

The typical specimen of *Muscicapa leucophrys*, d'Orb. & Lafr., at Paris, belongs to this species; but there being already a species of the genus of the same name (also named by d'Orb. & Lafr.) we retain Bonaparte's later appellation.

187. *FLUVICOLA ALBIVENTRIS* (Spix).

*Fluvicola bicolor*, d'Orb. & Lafr. Syn. Av. i. p. 58; d'Orb. Voy. Ois. p. 343, t. lvii. f. 2.

*Fluvicola albiventris*, Scl. Cat. Am. B. p. 200.

Prov. Chiquitos (O.).

188. *ARUNDINICOLA LEUCOCEPHALA* (Linn.).

*Alectrurus leucocephalus*, d'Orb. & Lafr. Syn. Av. i. p. 54.

*Arundinicola leucocephala*, d'Orb. Voy. Ois. p. 334.

Provinces of Moxos and Chiquitos (O.).

189. *ALECTORURUS TRICOLOR* (Vieill.).

*Alectrurus tricolor*, d'Orb. & Lafr. Syn. Av. i. p. 54; d'Orb. Voy. Ois. p. 341.

Guarayos, Prov. Moxos (O.).

190. *CYBERNETES YETAPA* (Vieill.).

*Gubernetes yperu*, d'Orb. & Lafr. Syn. Av. i. p. 58.

*Alectrurus yetapa*, d'Orb. Voy. Ois. p. 342.

Prov. Chiquitos (O.).

191. *SISOPYGIS ICTEROPHRYS* (Vieill.).

*Fluvicola icterophrys*, d'Orb. & Lafr. Syn. Av. i. p. 59.

*Suiriri icterophrys*, d'Orb. Voy. Ois. p. 338, t. xlv. f. 3.

*Sisopygis icterophrys*, Scl. Cat. A. B. p. 202.

Provinces of Chuquisaca and Sicasica (O.).

192. *CNIPOLEGUS ATERRIMUS* (d'Orb.).

*Fluvicola nigerrima*, d'Orb. & Lafr. Syn. Av. i. p. 59.

*Ada nigerrima*, d'Orb. Voy. Ois. p. 340.

*Cnipolegus aterrimus*, Scl. Cat. Am. B. p. 202.

Provinces of Yungas, Ayupaya, Cochabamba, Chuquisaca (O.); Sorata, Tilotilo, Prov. Yungas (B.).

193. *LICHENOPS PERSPICILLATA* (Gm.).

*Fluvicola perspicillata*, d'Orb. & Lafr. Syn. Av. i. p. 58.

*Ada perspicillata*, d'Orb. Voy. Ois. p. 339.

*Lichenops perspicillata*, Scl. Cat. Am. B. p. 203.

Prov. Chiquitos (O.).

194. *MACHETORNIS RIXOSA* (Vieill.).

*Pepoaza rixosa*, d'Orb. & Lafr. Syn. Av. i. p. 62; d'Orb. Voy. Ois. p. 350, t. li. f. 4 (egg).

*Machetornis rixosa*, Scl. Cat. Am. B. p. 204.

Provinces of Santa Cruz de la Sierra, Chiquitos, and Moxos (O.).

195. *MUSCISAXICOLA RUFIVERTEX*, d'Orb. & Lafr., Syn. Av. i. p. 66; d'Orb. Voy. Ois. p. 354, t. xli. f. 2; Scl. Cat. Am. B. p. 205.

Plateau of the Andes, La Paz, and Cobija (O.).

196. *MUSCISAXICOLA MENTALIS*, d'Orb. & Lafr. Syn. Av. i. p. 66; d'Orb. Voy. Ois. p. 355, t. xli. f. 1.

Cobija, West coast of Bolivia (O.).

197. *MUSCISAXICOLA MACULIROSTRIS*, d'Orb. & Lafr. Syn. Av. i. p. 66; d'Orb. Voy. Ois. p. 356, t. xli. f. 2.

La Paz (O.); Tilotilo, Prov. Yungas (B.).

198. *CENTRITES OREAS*, Scl. & Salv. P. Z. S. 1869, p. 154, et Ex. Orn. p. 191, t. xevi.; Allen, Bull. Mus. Comp. Zool. iii. p. 354.

*Anthus fulvus*, d'Orb. Voy. Ois. p. 223 (partim).

Quite common on the shores of Lake Titicaca (*Garman*).

199. *TODIROSTRUM CINEREUM* (Linn.); d'Orb. & Lafr. Syn. Av. i. p. 46; d'Orb. Voy. Ois. p. 315.

Mission de la Concepcion, Prov. Moxos (O.).

200. *EUSCARTHMUS GULARIS* (Temm.).

*Todirostrum gulare*, d'Orb. & Lafr. Syn. Av. i. p. 46; d'Orb. Voy. Ois. p. 315.

Carcuata, Prov. Yungas, Santo Corazon, Prov. Chiquitos (O.). Simacu, Prov. Yungas (B.).

201. *EUSCARTHMUS MARGARITACEIVENTRIS* (d'Orb. & Lafr.).

*Todirostrum margaritaceiventris*, d'Orb. & Lafr. Syn. Av. i. p. 46; d'Orb. Voy. Ois. p. 316, t. xxxiii. f. 3, 4.

*Euscarthmus margaritaceiventris*, Scl. & Salv. Nomencl. p. 45.

Santa Corazon, Prov. Chiquitos (O.).

## 202. ORCHILUS ECAUDATUS (d'Orb. &amp; Lafr.).

*Todirostrum ecaudatum*, d'Orb. & Lafr. Syn. Av. i. p. 47; d'Orb. Voy. Ois. p. 316, t. xxxiii. f. 1, 2.

*Orchilus ecaudatus*, Scl. & Salv. P. Z. S. 1868, p. 631.

Territory of the Yuracares Indians (O.).

## 203. STIGMATURA BUDYTOIDES (d'Orb. &amp; Lafr.).

*Culicivora budytoides*, d'Orb. & Lafr. Syn. Av. i. p. 56.

*Setophaga budytoides*, d'Orb. Voy. Ois. p. 330.

*Stigmatura budytoides*, Scl. & Salv. P. Z. S. 1866, p. 188.

Valley of Chaluani, Prov. Mizqué (O.).

## 204. SERPHOPHAGA SUBCRISTATA (Vieill.).

*Muscicapa cristata*, d'Orb. & Lafr. Syn. Av. i. p. 52.

*Muscicapara subcristata*, d'Orb. Voy. Ois. p. 326.

*Serphophaga subcristata*, Scl. & Salv. Nomencl. p. 47.

Prov. Chiquitos (O.); Tilotilo, Prov. Yungas (B.).

## 205. SERPHOPHAGA CINEREA (Strickl.).

*Serpophaga cinerea*, Scl. Cat. A. B. p. 211.

Baganti, Prov. Yungas (B.).

## 206. ANÆRETES PARULUS (Kittl.).

*Culicivora parulus*, d'Orb. & Lafr. Syn. Av. i. p. 57; d'Orb. Voy. Ois. p. 332 (Chili).

Yuyo, Prov. Yungas (B.).

## 207. ANÆRETES FLAVIROSTRIS, Scl. &amp; Salv. P. Z. S. 187 p. 355.

Tilotilo, Prov. Yungas (B.).

## 208. MIONECTES OLEAGINEUS (Licht.).

*Muscicapa chloronota*, d'Orb. & Lafr. Syn. Av. i. p. 51.

*Muscicapara oleaginea*, d'Orb. Voy. Ois. p. 323.

*Mionectes oleagineus*, Scl. Cat. Am. B. p. 213.

Territory of the Yuracares Indians (O.).

## 209. MIONECTES STRIATICOLLIS (d'Orb. &amp; Lafr.).

*Muscicapa striaticollis*, d'Orb. & Lafr. Syn. Av. i. p. 51.

*Muscicapara striaticollis*, d'Orb. Voy. Ois. p. 323. t. xxxv. f. 2.

Prov. Yungas and Territory of the Yuracares Indians (O.); Tilotilo, Prov. Yungas (B.).

## 210. LEPTOPOGON SUPERCILIARIS (Cab.).

*Leptopogon superciliaris*, Scl. Cat. A. B. p. 214.

Carguarani, Prov. Yungas (B.).

## 211. LEPTOPOGON TRISTIS, Scl. &amp; Salv. P. Z. S. 1876, p. 254.

Simacu, Prov. Yungas (B.).

212. *TYRANNISCUS GRACILIPES*, Scl. & Salv. P. Z. S. 1867, p. 981.

Simacu, Prov. Yungas (B.).

213. *TYRANNISCUS VIRIDISSIMUS*, Scl. P. Z. S. 1873, p. 782.

Tilotilo, Prov. Yungas (B.).

214. *ELAINEA ALBICEPS* (d'Orb. & Lafr.).

*Muscipeta albiceps*, d'Orb. & Lafr. Syn. Av. i. p. 47; d'Orb. Voy. Ois. p. 319.

*Elainea albiceps*, Scl. P. Z. S. 1870, p. 834.

Prov. Yungas (O.).

215. *ELAINEA ELEGANS*, Pelz. Orn. Bras. p. 179; Scl. P. Z. S. 1870, p. 835.

Simacu, Prov. Yungas (B.).

216. *EMPIDAGRA SUIRIRI* (Vieill.).

*Muscicapa suiriri*, d'Orb. & Lafr. Syn. Av. i. p. 51.

*Suiriri suiriri*, d'Orb. Voy. Ois. p. 336.

*Pachyrhynchus albescens*, Gould, Zool. Beagle, iii. p. 51, pl. xiv.

*Empidagra suiriri*, Cab. Mus. Hein. ii. p. 59.

Provinces of Moxos and Chiquitos (O.).

217. *LEGATUS ALBICOLLIS* (Vieill.).

*Muscipeta albicollis*, d'Orb. & Lafr. Syn. Av. i. p. 47; d'Orb. Voy. Ois. p. 317.

Rio de San Miguel, Territory of the Guarayos Indians (O.).

218. *MYIOZETETES SIMILIS* (Spix).

*Muscipeta cayennensis*, d'Orb. & Lafr. Syn. Av. i. p. 47; d'Orb. Voy. Ois. p. 317.

*Myiozetetes similis*, Scl. Cat. Am. B. p. 224.

Rio Blanco and Rio Itonama, Prov. Moxos (O.).

219. *ELAINEA OBSCURA* (d'Orb. & Lafr.).

*Muscipeta obscura*, d'Orb. & Lafr. Syn. Av. i. p. 48.

*M. guillemini*, d'Orb. Voy. Ois. p. 319.

*Elainea obscura*, Scl. P. Z. S. 1870, p. 835.

Prov. Yungas (O.); Tilotilo, Prov. Yungas (B.).

220. *PITANGUS BELlicosus* (Vieill.).

*Tyrannus sulphuratus*, d'Orb. & Lafr. Syn. Av. i. p. 42; d'Orb. Voy. Ois. p. 304, tt. xxxiv. f. 3, xlix. f. 3.

*Pitangus bellicosus*, Scl. Cat. Am. B. p. 222.

Provinces of Chiquitos, Cochabamba, Chuquisaca (O.).

## 221. MYIODYNASTES SOLITARIUS (Vieill.).

*Tyrannus audax*, d'Orb. & Lafr. Syn. Av. i. p. 43; d'Orb. Voy. Ois. p. 305.

*Myiodynastes solitarius*, Scl. Cat. Am. B. p. 223.

Santa Cruz de la Sierra and Chiquitos (O.).

## 222. MUSCIVORA SWAINSONI (Pelz.).

*Muscipeta regia*, d'Orb. Voy. Ois. p. 317.

*Muscivora swainsoni*, Scl. Cat. Am. B. p. 224.

Territory of the Yuracares Indians (O.).

## 223. HIRUNDINEA RUPESTRIS (Max.).

*Hirundinea bellicosa*, d'Orb. & Lafr. Syn. Av. i. p. 46; d'Orb. Voy. Ois. p. 314.

*H. rupestris*, Scl. Ibis, 1869, p. 196.

*H. bellicosa*, Reinh. Fuglef. Bras. Campos, p. 144.

Tilotilo, Prov. Yungas (B.).

Mission de Santiago, Prov. Chiquitos, Cochabamba, Chuquisaca, Chaluani (O.).

Bolivian examples of this species do not differ appreciably from the Brazilian bird.

224. MYIOBIUS VILLOSUS, Scl.; Scl. & Salv. *anted*, p. 514.

Tilotilo, Prov. Yungas (B.).

## 225. MYIOBIUS CINNAMOMEUS (d'Orb. &amp; Lafr.).

*Muscipeta cinnamomea*, d'Orb. & Lafr. Syn. Av. i. p. 49.

*M. vieilloti*, d'Orb. Voy. Ois. p. 321, t. xxxiv. f. 1, 2.

*M. cinnamomeus*, Scl. Cat. p. 226.

Prov. Yungas (O.); Simacu, Prov. Yungas (B.).

## 226. MYIOBIUS NÆVIUS (Bodd.).

*Muscipeta virgata*, d'Orb. & Lafr. Syn. Av. i. p. 49; d'Orb. Voy. Ois. p. 320.

*Myiobius nævius*, Scl. Cat. Am. B. p. 227.

Provinces of Moxos, Chiquitos, and Yungas (O.).

## 227. EMPIDOCANES, sp. inc.

Nairapi, Prov. Yungas (B.).

One bad skin of a species allied to *E. olivus* (Bodd.).

## 228. CONTOPUS RICHARDSONI (Sw.); Scl. Cat. Am. B. p. 231.

Nairapi, Prov. Yungas (B.).

## 229. CONTOPUS ARDESIACUS (Lafr.); Scl. &amp; Salv. Nomencl. p. 52.

*Myiochanes ardesiacus*, Scl. Cat. p. 232.

Tilotilo, Prov. Yungas (B.).

## 230. EMPIDONOMUS VARIUS (Vieill.); Scl. Cat. Am. B. p. 234.

Mapari, Prov. Yungas (B.).

## 231. MYIARCHUS TYRANNULUS (Müll.).

*M. ferox*, d'Orb. & Lafr. Syn. Av. i. p. 43; d'Orb. Voy. Ois. p. 306.

*Myiarchus swainsoni*, Scl. Cat. Am. B. p. 233.

*M. tyrannulus*, Scl. & Salv. Nomencl. p. 52.

Provinces of Yungas, Moxos, Chiquitos, and Santa Cruz de la Sierra (O.); Typuani, Tilotilo, Prov. Yungas (B.).

## 232. MYIARCHUS NIGRICEPS, Scl.

*Myiarchus tuberculifer*, d'Orb. & Lafr. Syn. Av. i. p. 43; d'Orb. Voy. Ois. p. 307, t. xxxii. fig. 2 (?).

*M. nigriceps*, Scl. P. Z. S. 1860, p. 68.

We suspect that *M. tuberculifer* is the same as *M. nigriceps*, in some individuals of which, as in other Tyrannidæ, the tubercles on the wing are much more developed than in others.

Tilotilo, Prov. Yungas (B.).

## 233. TYRANNUS PIPIRI (Vieill.).

*Tyrannus animosus*, d'Orb. & Lafr. Syn. Av. i. p. 45.

*Tyrannus intrepidus*, d'Orb. Voy. Ois. p. 313.

*Tyrannus pipiri*, Scl. Cat. p. 236.

Santa Cruz de la Sierra (O.).

## 234. TYRANNUS AURANTIO-ATROCISTATUS, d'Orb. &amp; Lafr. Syn. Av. i. p. 45; d'Orb. Voy. Ois. p. 312.

*Tyrannus inca*, Scl. Cat. Am. B. p. 237.

Valle Grande (O.).

In Sclater's collection from Bolivia; obtained by E. Bartlett at Xeberos. See P. Z. S. 1873, p. 282.

## 235. TYRANNUS MELANCHOLICUS (Vieill.); d'Orb. &amp; Lafr. Syn. Av. i. p. 44; d'Orb. Voy. Ois. p. 311, t. li. f. 33 (egg).

Provinces of Santa Cruz de la Sierra, Chiquitos, Moxos (O.); Cangalli, Tilotilo, Prov. Yungas (B.).

## 236. MILVULUS TYRANNUS (Linn.).

*Tyrannus savana*, d'Orb. & Lafr. Syn. Av. i. p. 44.

*Tyrannus tyrannus*, d'Orb. Voy. Ois. p. 310, t. xlv. f. 2.

Santa Cruz, Provinces of Moxos and Chiquitos (O.).

## Fam. COTINGIDÆ.

## 237. PIPRA FASCIATA, d'Orb. &amp; Lafr. Syn. Av. i. p. 38; d'Orb. Voy. Ois. p. 295, t. xxx. f. 1.

Environs of Santa Cruz de la Sierra, and Territory of the Guarayos Indians (O.).

238. *PIPPRA CHLOROMEROS* (Tsch.).

*Pipra rubrocapilla*, d'Orb. & Lafr. Syn. Av. i. p. 38; d'Orb. Voy. Ois. p. 294.

*Pipra chloromeros*, Sel. Cat. Am. B. p. 248.

Baganti, Prov. Yungas (B.); Territory of the Yuracares Indians (O.).

239. *CHIROXIPHIA PAREOLA* (Linn.).

Nairapi, Tilotilo, Prov. Yungas (B.).

Bolivian agree with Brazilian skins, except in having the crest rather narrower and of a somewhat darker colour.

240. *METOPTIA GALEATA* (Licht.); Sel. Cat. Am. B. p. 252.

Simacu, Prov. Yungas (B.).

241. *TITYRA CAYANA* (Linn.).

*Psaris cayanus*, d'Orb. & Lafr. Syn. Av. i. p. 41; d'Orb. Voy. p. 301.

Santa Cruz de la Sierra, Chiquitos, Moxos (O.).

242. *TITYRA SEMIFASCIATA* (d'Orb. & Lafr.).

*Psaris semifasciata*, d'Orb. & Lafr. Syn. Av. i. p. 41; d'Orb. Voy. Ois. p. 301.

*Tityra semifasciata*, Sel. Cat. Am. B. p. 238.

Environs of Santa Cruz de la Sierra and Santo Corazon (O.); Simacu, Prov. Yungas (B.).

243. *TITYRA INQUISITRIX* (Vieill.).

*Psaris inquisitor*, d'Orb. & Lafr. Syn. Av. i. p. 41; d'Orb. Voy. Ois. p. 302.

*Tityra inquisitrix*, Sel. P. Z. S. 1857, p. 71.

Provinces of Santa Cruz de la Sierra and Chiquitos (O.).

244. *HADROSTOMUS MINOR* (Less.).

*Psaris roseicollis*, d'Orb. & Lafr. Syn. Av. i. p. 42; d'Orb. Voy. Ois. p. 302.

*Hadrostomus minor*, Sel. Cat. Am. B. p. 240.

Territory of the Yuracares and Guarayos Indians, Prov. Chiquitos (O.).

245. *PACHYRHAMPHUS ATRICAPILLUS* (Gm.).

*Pachyrhynchus marginatus*, d'Orb. & Lafr. Syn. Av. i. p. 42; d'Orb. Voy. Ois. p. 303, t. xxxi. f. 2, 3, 4.

*Pachyrhamphus atricapillus*, Sel. & Salv. Nomencl. p. 56.

Territory of the Yuracares Indians (O.).

246. *LATHRIA UROPYGIALIS*, Sel. & Salv. P. Z. S. 1876, p. 355.

Tilotilo, Prov. Yungas (B.).

## 247. LATHRIA PLUMBEA (Licht.).

*Querula cinerea*, d'Orb. & Lafr. Syn. Av. i. p. 39.

*Querula cineracea*, d'Orb. Voy. Ois. p. 296.

Mission de Magdalena, Prov. Moxos (O.); Guanai, Prov. Yungas (B.).

## 248. CASIORNIS RUBRA (Vieill.).

*Tyrannus rufus*, d'Orb. & Lafr. Syn. Av. i. p. 44; d'Orb. Voy. Ois. p. 308.

*Casiornis rubra*, Sel. & Salv. Nomencl. p. 57.

Provinces of Yungas and Chiquitos (O.).

The specimens of d'Orbigny marked *Tyrannus rufus* in the Paris Museum belong to this species.

## 249. RUPICOLA PERUVIANA, Lath.; d'Orb. &amp; Lafr. Syn. Av. i. p. 38; d'Orb. Voy. Ois. p. 294.

*Rupicola saturata*, Cab. & Hein. Mus. Hein. ii. p. 99.

Provinces of Yungas, and forests east of Cochabamba (O.); Simacu, Tilotilo, Prov. Yungas (B.).

Bolivian skins are intermediate in tint between *R. peruviana* and *R. sanguinolenta*.

## 250. PIPREOLA VIRIDIS (d'Orb. &amp; Lafr.).

*Ampelis viridis*, d'Orb. & Lafr. Syn. Av. i. p. 40; d'Orb. Voy. Ois. p. 298, t. xxx. f. 2.

*Pipreola viridis*, Sel. Ibis, 1878, p. 167.

Chulumani, Prov. Yungas (O.); Tilotilo, Prov. Yungas (B.).

## 251. PIPREOLA FRONTALIS (Sel.); Sel. Ibis, 1878, p. 169, pl. vi. Tilotilo, Prov. Yungas (B.).

## 252. AMPELIS ARCUATA (Lafr.); Sel. Cat. A. B. p. 255.

Tilotilo, Prov. Yungas (B.).

## 253. HELIOCHERA RUBROCRISTATA (d'Orb. &amp; Lafr.).

*Ampelis rubrocristata*, d'Orb. & Lafr. Syn. Av. i. p. 39; d'Orb. Voy. Ois. p. 297, t. xxxi. f. 1.

*Heliochera rubrocristata*, Sel. Cat. Am. B. p. 255.

Provinces of Yungas and Ayupaya (O.).

## 254. COTINGA CAYANA (Linn.).

*Ampelis cayana*, d'Orb. & Lafr. Syn. Av. i. p. 40.

*Ampelis cayennensis*, d'Orb. Voy. Ois. p. 297.

*Cotinga cayana*, Sel. Cat. Am. B. p. 256.

Territory of the Yuracares Indians (O.).

## 255. CEPHALOPTERUS ORNATUS, Geoffr.; d'Orb. &amp; Lafr. Syn. Av. i. p. 39; d'Orb. Voy. Ois. p. 296.

Tilotilo, Prov. Yungas (B.); Apolobamba (O.).



## Fam. PHYTOTOMIDÆ.

256. *PHYTOTOMA ANGUSTIROSTRIS*, d'Orb. & Lafr. Syn. Av. i. p. 37; d'Orb. Voy. Ois. p. 292, t. xxix. f. 2; Scl. Cat. Am. B. p. 260.

Valley of La Paz and environs of Cavari, Inquisivi, Prov. Sicasica, Palta, Prov. Ayupaya, Provinces of Cochabamba, Mizqué, and Chuquisaca (O.); Tilotilo, Prov. Yungas (B.).

## Fam. DENDROCOLAPTIDÆ.

257. *GEOSITTA CUNICULARIA* (Vieill.).

*Certhilauda cunicularia*, d'Orb. & Lafr. Syn. Av. i. p. 71; d'Orb. Voy. Ois. p. 358, t. xliii. f. 1.

*Geositta cunicularia*, Scl. Cat. Am. B. p. 146.

La Paz, Cochabamba, and summit of the Cordillera (O.).

258. *GEOSITTA TENUIROSTRIS* (d'Orb. & Lafr.).

*Certhilauda tenuirostris*, d'Orb. & Lafr. Syn. Av. i. p. 72; d'Orb. Voy. Ois. p. 359, t. xliii. f. 2.

*Geositta tenuirostris*, Scl. & Salv. P. Z. S. 1869, p. 153.

Cavari, Prov. Sicasica, Cochabamba (O.).

259. *FURNARIUS COMMERSONI*, Pelzeln, Orn. Brás. p. 34.

Tilotilo, Prov. Yungas (B.).

260. *UPUCERTHIA RUFICAUDA* (Meyen.).

*Upucertbia montana*, d'Orb. & Lafr. Syn. Av. ii. p. 22; d'Orb. Voy. Ois. p. 371, t. lvi. f. 1.

*Ochetorhynchus ruficauda*, Scl. Cat. Am. B. p. 148.

Environs of La Paz (O.).

261. *CINCLODES NIGRIFUMOSUS* (d'Orb. & Lafr.).

*Upucertbia nigrifumosa*, d'Orb. & Lafr. Syn. Av. ii. p. 22; d'Orb. Voy. Ois. p. 372, t. lvii. f. 2.

Cobija (O.); Tilotilo, Prov. Yungas (B.).

262. *CINCLODES PATAGONICUS* (Gm.).

*Upucertbia rupestris*, d'Orb. & Lafr. Syn. Av. ii. p. 21.

*Cinclodes patagonicus*, Scl. Cat. Am. B. p. 148.

Cobija (O.).

263. *CINCLODES FUSCUS* (Vieill.).

*Upucertbia vulgaris*, d'Orb. & Lafr. Syn. Av. ii. p. 22; d'Orb. Voy. Ois. p. 372, t. lvii. f. 1.

*Cinclodes fuscus*, Scl. & Salv. P. Z. S. 1870, p. 786.

Potosi, Oruro, La Paz, and Chuquisaca (O.); Sorata, Tilotilo, Prov. Yungas (B.).

264. *LOCHMIAS OBSCURATA*, Cab. J. f. O. 1873, p. 65.

*L. sororia*, Scl. & Salv. P. Z. S. 1873, p. 511.

Baganti, Prov. Yungas (B.).

## 265. LEPTASTHENURA ÆGITHALOIDES (Kittl.).

*Synallaxis ægithaloides*, d'Orb. & Lafr. Syn. Av. i. p. 23; d'Orb. Voy. Ois. p. 243.

Cobija, and environs of La Paz (O.).

## 266. LEPTASTHENURA FULIGINICEPS (d'Orb. &amp; Lafr.).

*Synallaxis fuliginiceps*, d'Orb. & Lafr. Syn. Av. i. p. 23; d'Orb. Voy. Ois. p. 242, t. xvii. f. 1.

Inquisivi, Prov. Sicasica, Valle Grande (O.); Tilotilo, Prov. Yungas (B.).

## 267. SYNALLAXIS FRONTALIS, Pelz.

*Synallaxis ruficapilla*, d'Orb. & Lafr. Syn. Av. i. p. 24; d'Orb. Voy. Ois. p. 246.

*Synallaxis frontalis*, Scl. P. Z. S. 1874, p. 7.

Carcuata, Prov. Yungas, Inquisivi, Prov. Sicasica, Chaluani, Prov. Mizqué, Prov. Moxos (O.); Ramosani, Prov. Yungas (B.).

## 268. SYNALLAXIS SEMICINEREA (Reichenbach).

*Synallaxis semicinerea*, Scl. P. Z. S. 1874, p. 12.

Valle Grande (O., Mus. Paris).

## 269. SYNALLAXIS TORQUATA, Max.

*Synallaxis bitorquata*, d'Orb. & Lafr. Syn. Av. i. p. 24.

*S. torquata*, d'Orb. Voy. Ois. p. 248, t. xv. f. 2; Scl. P. Z. S. 1874, p. 17.

Mission de la Concepcion, Prov. Chiquitos (O.).

## 270. SYNALLAXIS MAXIMILIANI, d'Orb.

*Synallaxis torquata*, d'Orb. Syn. Av. i. p. 25.

*Synallaxis maximiliani*, d'Orb. Voy. Ois. p. 247, t. xv. f. 1; Scl. P. Z. S. 1874, p. 17.

Carcuata, Prov. Yungas (O.).

## 271. SYNALLAXIS HYPOSTICTA, Pelzeln; Scl. P. Z. S. 1874, p. 20.

Territory of the Yuracares Indians (O., Mus. Paris).

## 272. SYNALLAXIS RUFIPENNIS, sp. nov.

*Synallaxis striaticeps*, d'Orb. & Lafr. Syn. Av. i. p. 22; d'Orb. Voy. Ois. p. 241, t. xvi. f. 1 (partim).

*Supra murino-cinerea; pileo fulvo, nigro striato; superciliis albis; tectricibus alarum et secundariis extus cum cauda tota rufis; subtus alba, hypochondriis et crisso fusco lavatis; rostro nigricante, mandibula inferiore ad basin carnea; pedibus fuscis. Long tota 5·5, alæ 2·6, caudæ 3·0.*

*Hab.* Bolivia, Tilotilo (Buckley).

*Obs.* Species formâ et habitu *S. striaticipitis*, sed pileo toto conspicuè striato et secundariis extus rufis distinguenda.

This species was probably confounded by d'Orbigny with *S. striaticeps*, as he mentions the latter as occurring in Bolivia. It should be placed next to *S. striaticeps* in the arrangement of the genus as given by Sclater (P. Z. S. 1874, p. 21).

273. *SYNALLAXIS ALBICEPS*, d'Orb. & Lafr. Syn. Av. i. p. 23; d'Orb. Voy. Ois. p. 241, t. xvi. f. 2; Scl. P. Z. S. 1874, p. 21.

Capiñata, Prov. Sicasica (O.); Tilotilo, Prov. Yungas (B.).

274. *SYNALLAXIS ORBIGNII*, Reichenbach.

*Synallaxis humicola*, d'Orb. & Lafr. Syn. Av. i. p. 24; d'Orb. Voy. Ois. p. 245, t. xvii. f. 2 (nec Kittl.); Scl. Cat. Am. B. p. 153.

*Synallaxis orbignii*, Scl. P. Z. S. 1874, p. 22, et P. Z. S. 1879, p. 461.

*Synallaxis fugax*, Doering, MS., Scl. P. Z. S. 1879, p. 461.

Valley of La Paz, Cochabamba, environs of Palca, Prov. Ayupaya (O.).

275. *HACELODOMUS SIBILATOR*.

*Anabates rufifrons*, d'Orb. & Lafr. Syn. Av. ii. p. 19.

*Anumbius frontalis*, d'Orb. Voy. Ois. p. 256.

*Placellodomus frontalis*, Scl. Cat. Am. B. p. 154 (partim).

"*P. sibilatrix*, Döring;" Scl. *antea*, p. 461.

Prov. Sicasica (O.).

276. *PLACELLODOMUS RUBER* (Vieill.).

*Anabates ruber*, d'Orb. & Lafr. Syn. Av. ii. p. 14.

*Anumbius ruber*, d'Orb. Voy. Ois. p. 253.

Prov. Chiquitos (O.).

277. *PSEUDOCOLAPTES BOISSONEAUTI* (Lafr.); Scl. Cat. Am. B. p. 156.

Tilotilo, Prov. Yungas (B.).

278. *HOMORUS UNIRUFUS* (d'Orb. & Lafr.).

*Anabates unirufus*, d'Orb. & Lafr. Syn. Av. ii. p. 16; d'Orb. Voy. Ois. p. 370, t. lv. f. 1.

*Homorus unirufus*, Scl. Cat. Am. B. App. p. 360.

Prov. Moxos (O.).

279. *AUTOMOLUS STRIATICEPS*, Scl. & Salv. P. Z. S. 1875, p. 37; Tacz. P. Z. S. 1874, p. 528.

Guanai, Tilotilo, Prov. Yungas (B.).

280. *PHILYDOR RUFICAUDATUS* (d'Orb. & Lafr.).

*Anabates ruficaudatus*, d'Orb. & Lafr. Syn. Av. ii. p. 15.

Territory of the Yuracares Indians (O.).

281. *ANABAZENOPS RUFOSUPERCILIATUS* (d'Orb. & Lafr.).

*Xenops rufosuperciliatus*, d'Orb. & Lafr. Syn. Av. ii. p. 13.

Prov. Yungas (O.).

282. *ANABAZENOPS TEMPORALIS*, Scl. P. Z. S. 1859, p. 141.

Tilotilo, Prov. Yungas (*B.*).

283. *SITTASOMUS ERITHACUS* (Licht.).

*Dendrocolaptes sylviellus*, d'Orb. & Lafr. Syn. Av. ii. p. 13.

*Sittasomus erithacus*, Scl. & Salv. P. Z. S. 1868, p. 630.

Prov. Chiquitos (*O.*).

284. *MARGARORNIS SQUAMIGERA* (d'Orb. & Lafr.).

*Anabates squamiger*, d'Orb. & Lafr. Syn. Av. ii. p. 14; d'Orb. Voy. Ois. p. 369, t. liv. f. 2.

*Margarornis squamiger*, Salv. Ibis, 1874, p. 322.

Palca, Prov. Ayupaya (*O.*); Tilotilo, Prov. Yungas (*B.*).

285. *DENDROCOLAPTES CERTHIA* (Bodd.).

*Picus certhia*, Bodd. Tabl. d. Pl. Enl. p. 38.

*Dendrocolaptes cayennensis*, d'Orb. & Lafr. Syn. Av. ii. p. 11; Scl. Cat. Am. B. p. 162.

Prov. Chiquitos (*O.*).

286. *DENDROCINCLA ATRIROSTRIS* (d'Orb. & Lafr.).

*Dendrocolaptes atrirostris*, d'Orb. & Lafr. Syn. Av. ii. p. 12.

Territory of the Guarayos Indians (*O.*).

287. *XIPHOCOLAPTES PROMEROPIRHYNCHUS* (Less.); Scl. Cat. p. 163.

*Dendrocolaptes albicollis*, d'Orb. & Lafr. Syn. ii. p. 10 (?)

Tilotilo, Prov. Yungas (*B.*).

Mr. Buckley's skins seem hardly separable from this species; but Lafresnaye refers d'Orbigny's Bolivian examples to his *X. simpliceps* (Rev. Zool. 1850, p. 100).

288. *XIPHOCOLAPTES MAJOR* (Vieill.).

*Dendrocolaptes major*, d'Orb. & Lafr. Syn. Av. ii. p. 11.

*Xiphocolaptes major*, Scl. Cat. Am. B. p. 164.

Prov. Chiquitos (*O.*).

289. *DENDRORNIS GUTTATA* (Licht.).

*Dendrocolaptes guttatus*, d'Orb. & Lafr. Syn. Av. ii. p. 11.

Territory of the Guarayos Indians (*O.*); Guanai, Prov. Yungas (*B.*).

290. *DENDRORNIS PARDALOTUS* (Vieill.); Scl. Cat. Am. B. p. 164.

Nairapi, Prov. Yungas (*B.*).

291. *DENDRORNIS TRIANGULARIS* (Lafr.); Scl. Cat. Am. B. p. 165.

Simacu, Prov. Yungas (*B.*).

## 292. PICOLAPTES BIVITTATUS (d'Orb. &amp; Lafr.).

*Dendrocolaptes bivittatus*, d'Orb. & Lafr. Syn. Av. ii. p. 12.*Picolaptes bivittatus*, Scl. Cat. Am. B. p. 167.

Prov. Chiquitos (O.).

## 293. XIPHORHYNCHUS LAFRESNAYANUS, d'Orb.

*Dendrocolaptes procurrus*, d'Orb. & Lafr. Syn. Av. ii. p. 12.*D. lafresnayanus*, d'Orb. Voy. Ois. p. 368, t. liii. f. 2.*Xiphorhynchus lafresnayanus*, Scl. Cat. Am. B. p. 168.

Prov. Chiquitos (O.).

We are very doubtful whether the Bolivian form thus designated by d'Orbigny is really distinct from *X. trochilirostris*.

## Fam. FORMICARIIDÆ.

## 294. THAMNOPHILUS MAJOR, d'Orb. &amp; Lafr.

*Thamnophilus major*, d'Orb. & Lafr. Syn. Av. i. p. 10; d'Orb. Voy. Ois. p. 166; Scl. P. Z. S. 1858, p. 208, Cat. Am. B. p. 172.

Provinces of Yungas, Cochabamba, and Santa Cruz de la Sierra (O.).

## 295. THAMNOPHILUS NÆVIUS (Gm.); d'Orb. &amp; Lafr. Syn. Av. i. p. 10; d'Orb. Voy. Ois. p. 170.

Missions de San Miguel, La Concepcion, and Santa Ana, Prov. Chiquitos (O.).

## 296. THAMNOPHILUS ASPERSIVENTRIS, d'Orb. &amp; Lafr. Syn. Av. i. p. 11; d'Orb. Voy. Ois. p. 171, t. iv.

Provinces of Yungas, Sicasica, and Ayupaya (O.); Simacu, Tilotilo, Prov. Yungas (B.).

## 297. THAMNOPHILUS DOLIATUS (Linn.); d'Orb. &amp; Lafr. Syn. Av. i. p. 10; d'Orb. Voy. Ois. p. 168.

Chulumani and Irupana, Prov. Yungas, Provinces of Santa Cruz de la Sierra, Chiquitos, and Moxos (O.).

## 298. THAMNOPHILUS PALLIATUS, Licht.; d'Orb. &amp; Lafr. Syn. Av. i. p. 11; d'Orb. Voy. Ois. p. 174.

Prov. Chiquitos (O.); Consata, Tilotilo, Prov. Yungas (B.).

## 299. THAMNOPHILUS TORQUATUS, d'Orb. &amp; Lafr.

*Thamnophilus atropileus*, d'Orb. & Lafr. Syn. Av. i. p. 11; d'Orb. Voy. Ois. p. 173.

*Thamnophilus torquatus*, Scl. P. Z. S. 1858, p. 220.

Territory of the Guarayos Indians (O.).

## 300. THAMNOPHILUS SUBFASCIATUS, Scl. &amp; Salv. P. Z. S. 1876, p. 357.

Tilotilo, Prov. Yungas (B.).

301. *DYSITHAMNUS GUTTULATUS* (Licht.).

*Thamnophilus striatothorax*, d'Orb. & Lafr. Syn. Av. i. p. 12;  
d'Orb. Voy. Ois. p. 176.

*Dysithamnus guttulatus*, Scl. P. Z. S. 1858, p. 221.

Territory of the Yuracares Indians (O.).

302. *DYSITHAMNUS MENTALIS* (d'Orb. et Lafr.).

*Thamnophilus mentalis*, d'Orb. & Lafr. Syn. Av. i. p. 12; d'Orb.  
Voy. Ois. p. 177.

*Dysithamnus mentalis*, Scl. Cat. Am. B. p. 177.

Prov. Yungas (O.).

303. *DYSITHAMNUS SCHISTACEUS* (d'Orb.).

*Thamnophilus fuliginosus*, d'Orb. & Lafr. Syn. Av. i. p. 10.

*Thamnophilus schistaceus*, d'Orb. Voy. Ois. p. 170, t. v. f. 1.

Territory of the Yuracares Indians (O.).

304. *THAMNOMANES CÆSIUS* (Licht.).

*Tyrannus cæsius*, d'Orb. Voy. Ois. p. 309.

*Thamnomanes cæsius*, Scl. Cat. Am. B. p. 178.

Territory of the Yuracares Indians (O.).

305. *HERPSILOCHOMUS PILEATUS* (Licht.).

*Thamnophilus pileatus*, d'Orb. & Lafr. Syn. Av. i. p. 12; d'Orb.  
Voy. Ois. p. 175; Scl. P. Z. S.

*Herpsilochomus pileatus*, Scl. P. Z. S. 1858, p. 233.

Mission de San José, Prov. Chiquitos (O.).

306. *MYRMOTHERULA PYGMÆA* (Gm.).

*Thamnophilus minutus*, d'Orb. & Lafr. Syn. Av. i. p. 12.

*Myrmotherula pygmæa*, Scl. P. Z. S. 1858, p. 234.

Territory of the Yuracares Indians (O.).

307. *MYRMOTHERULA AXILLARIS* (Vieill.).

*Thamnophilus axillaris*, d'Orb. & Lafr. Syn. Av. i. p. 12.

*Tamnophilus axillaris*, d'Orb. Voy. Ois. p. 183.

Cochabamba, and Territory of the Yuracares Indians (O.).

308. *MYRMOTHERULA MÉNÉTRIÉSI* (d'Orb.).

*Myrmothera ménétriési*, d'Orb. Voy. Ois. p. 184.

Cochabamba, and Territory of the Yuracares Indians (O.).

309. *FORMICIVORA RUFATRA* (d'Orb. & Lafr.).

*Thamnophilus rufater*, d'Orb. & Lafr. Syn. Av. i. p. 12; d'Orb.  
Voy. Ois. p. 180.

Provinces of Chiquitos and Moxos (O.).

## 310. PYRIGLENA LEUCOPTERA (Vieill.).

*Thamnophilus domicella*, d'Orb. & Lafr. Syn. Av. i. p. 11.*Formicivora domicella*, d'Orb. Voy. Ois. p. 178.*Pyriglena leucoptera*, Scl. P. Z. S. 1858, p. 246.

Mission de Santa Ana, Prov. Chiquitos (O.).

## 311. PYRIGLENA ATRA (Sw.).

*Thamnophilus aterrimus*, d'Orb. & Lafr. Syn. Av. i. p. 12.*Formicivora atra*, d'Orb. Voy. Ois. p. 179.*Pyriglena atra*, Scl. P. Z. S. 1858, p. 246.

Rio de Chairó, Prov. Yungas, and Prov. Chiquitos (O.).

## 312. MYRMECIZA HEMIMELÆNA, Scl.

*Thamnophilus guttatus*, d'Orb. & Lafr. Syn. Av. i. p. 13; d'Orb. Voy. Ois. p. 177 (nec Vieill.).*Myrmeciza hemimelæna*, Scl. P. Z. S. 1857, p. 48, et 1858, p. 249.

Territory of the Yuracares Indians (O.).

## 313. HYPOCNEMIS NÆVIA (Gm.).

*Conopophaga nævia*, d'Orb. & Lafr. Syn. Av. i. p. 13; d'Orb. Voy. Ois. p. 186.

Territory of the Yuracares Indians (O.).

## 314. PHLOGOPSIS NIGRO-MACULATA (d'Orb. &amp; Lafr.).

*Myothera nigro-maculata*, d'Orb. & Lafr. Syn. Av. i. p. 14; d'Orb. Voy. Ois. p. 190, t. vi\*. f. 2.*Phlogopsis nigro-maculata*, Scl. P. Z. S. 1858, p. 276.

Territory of the Guarayos Indians (O.).

## 315. FORMICARIUS ANALIS (d'Orb. &amp; Lafr.).

*Myothera analis*, d'Orb. & Lafr. Syn. Av. i. p. 14; d'Orb. Voy. Ois. p. 191, t. vi. f. 1.*Formicarius analis*, Salvin, P. Z. S. 1866, p. 74.

Between Santa Cruz de la Sierra and Chiquitos (O.).

## 316. CHAMÆZA OLIVACEA, Tsch.; Scl. P. Z. S. 1858, p. 279.

Tilotilo, Prov. Yungas (B.).

## 317. GRALLARIA SQUAMIGERA, Prevost; Scl. Ibis, 1877, p. 439.

Tilotilo, Prov. Yungas (B.).

## 318. GRALLARIA ERYTHROTIS, Scl. &amp; Salv. P. Z. S. 1876, p. 357.

Tilotilo, Prov. Yungas (B.).

## 319. CONOPOPHAGA ARDESIACA, d'Orb. &amp; Lafr. Syn. Av. i. p. 13; d'Orb. Voy. Ois. p. 181; Scl. Cat. Am. B. p. 193.

Rio Meguilla, Carcuata, Prov. Yungas (O.); Tilotilo, Prov. Yungas (B.).

320. *CORYTHOPIS NIGRO-CINCTA* (d'Orb. et Lafr.).

*Conopophaga nigro-cincta*, d'Orb. & Lafr. Syn. Av. i. p. 13; d'Orb. Voy. Ois. p. 187, t. vi. f. 2.

Mission de Santa Ana, Prov. Chiquitos (O.).

Fam. PTEROPTOCHIDÆ.

321. *SCYTALOPUS SYLVESTRIS*, Tacz. P. Z. S. 1874, p. 138.

Yuyo, Prov. Yungas (B.).

Fam. CYPSELIDÆ.

322. *CYPSELUS ANDICOLA*, d'Orb. & Lafr. Syn. Av. i. p. 70; d'Orb. Voy. Ois. p. 358.

Consata, Prov. Yungas (B.); La Paz, Cavari, and Inquisivi (O.).

323. *HEMIPROCNE ZONARIS* (Shaw).

*Chætura zonaris*, Scl. P. Z. S. 1865, p. 609.

Consata (B.).

Fam. CAPRIMULGIDÆ.

324. *PODAGER NACUNDA* (Vieill.).

*Caprimulgus nacunda*, d'Orb. & Lafr. Syn. Av. i. p. 67.

Santa Cruz de la Sierra, and Chiquitos (O.).

325. *CHORDEILES RUPESTRIS* (Spix).

*Caprimulgus rupestris*, d'Orb. & Lafr. Syn. Av. i. p. 68.

Prov. Moxos (O.).

326. *STENOPSIS ÆQUICAUDATA* (Peale).

*Antrostomus æquicaudatus*, Scl. P. Z. S. 1867, p. 342.

Tilotilo, Prov. Yungas (B.).

327. *HYDROPSALIS TRIFURCATA*, Scl. P. Z. S. 1866, p. 141.

Yuyo, Prov. Yungas (B.).

328. *HYDROPSALIS SEGMENTATA*, Cassin.

Tilotilo, Prov. Yungas (B.).

329. *NYCTIDROMUS ALBICOLLIS* (Gm.).

*Caprimulgus albicollis*, d'Orb. & Lafr. Syn. Av. i. p. 67.

*Nyctidromus albicollis*, Scl. P. Z. S. 1866, p. 144.

Prov. Chiquitos (O.).

Fam. TROCHILIDÆ.

330. *PHAETHORNIS SUPERCILIOSUS* (Linn.).

*Trochilus superciliosus*, d'Orb. & Lafr. Syn. Av. ii. p. 31.

*Phaethornis malaris*, Gould, Mon. Troch. i. pl. xvii.

Tilotilo (B.); Yungas, Guarayos (O.).



331. PHAETHORNIS PHILIPPII (Bourc.); Gould, Mon. Troch. i. pl. xxi.  
Bolivia (teste *Bourcier*).
332. PYGMORNIS PYGMÆUS (Spix); Gould, Mon. Troch. i. pl. lvi.  
*Trochilus brasiliensis*, d'Orb. & Lafr. Syn. Av. ii. p. 32.  
*Pygmornis pygmæus*, Elliot, Ibis, 1877, p. 141.  
Yuracares, Guarayos (O.); Guanai (B.).
333. THRENETES LEUCURUS (Linn.).  
*Trochilus leucurus*, d'Orb. & Lafr. Syn. Av. ii. p. 32.  
*Threnetes leucurus*, Elliot, Ibis, 1877, p. 142.  
Yuracares (O.).
334. CAMPYLOPTERUS ÆQUATORIALIS, Gould, Intr. to Troch. p. 54.  
Mapiri (B.).
335. APHANTOCHROA HYPOSTICTA, Gould, P. Z. S. 1862, p. 124.  
Nairapi (B.).
336. OREOTROCHILUS ESTELLA (d'Orb. et Lafr.).  
*Trochilus estella*, d'Orb. & Lafr. Syn. Av. ii. p. 32; d'Orb. Voy. Ois. p. 376, pl. lxi. fig. 1.  
*Oreotrochilus estella*, Gould, Mon. Troch. ii. pl. lxx.  
La Paz, Potosi (O.); Cachira (B.).
337. OREOTROCHILUS ADELA (d'Orb. et Lafr.).  
*Trochilus adela*, d'Orb. & Lafr. Syn. Av. ii. p. 33; d'Orb. Voy. Ois. p. 377, t. lxi. fig. 2.  
*Oreotrochilus adela*, Gould, Mon. Troch. ii. pl. lxxiii.  
Mizqui and Cachira (B.); Chuquisaca (O.).
338. LAMPORNIS VIOLICAUDA (Bodd.).  
*Trochilus mango*, d'Orb. & Lafr. Syn. Av. ii. p. 32.  
*Lampornis violicauda*, Elliot, Ibis, 1877, p. 141.  
Mojos, Guarayos (O.).
339. HEMISTEPHANIA LUDOVICÆ (Bourc.); Gould, Mon. Troch. ii. pl. lxxxviii.  
Tilotilo (B.).
340. HELIODOXA LEADBEATERI (Bourc.).  
*H. otero*, Gould, Mon. Troch. ii. pl. xvi.  
Near La Paz (*Bridges*, teste *Gould*); Tilotilo (B.).
341. THALURANIA NIGROFASCIATA (Gould); Elliot, Ibis, 1877, p. 335.  
*Ornismya furcata*, d'Orb. & Lafr. Syn. Av. ii. p. 27.  
Chiquitos, Santa Cruz, Moxos (O.); Consata, Nairapi, Apollo (B.).

342. *LOPHORNIS REGULUS*, Gould, Mon. Troch. iii. pl. cxx.  
Tilotilo (*B.*).
343. *ACESTRURA MULSANTI* (Bourc.); Gould, Mon. iii. pl. cxlv.  
*Orn. cyanopogon*, d'Orb. & Lafr. Syn. Av. ii. p. 28.  
*Acestrura mulsanti*, Elliot, Ibis, 1877, p. 136.  
Yungas (*O.*); Tilotilo (*B.*).
344. *STEGANURA ADDÆ* (Bourc.).  
*Spathura rufocaligata*, Gould, Mon. Troch. iii. pl. clxv.  
Sandillani, Yungas (*Bridges*, teste *Gould*); Bellavista, Tilotilo (*B.*).
345. *LESBIA NUNA* (Less.); Gould, Mon. Troch. iii. pl. clix.  
*Orn. gouldii*, d'Orb. & Lafr. Syn. Av. ii. p. 17.  
Enquisivi (*O.*); Sorata, Consata (*B.*).
346. *CYNANTHUS MOCOA* (Delattre et Bourc.); Gould, Mon. Troch. iii. pl. clxxiii.  
Quilabaya and Tilotilo (*B.*).
347. *SAPPHO SPARGANURA* (Shaw).  
*Cometes sparganurus*, Gould, Mon. Troch. iii. pl. clxxiv.  
*Orthorhynchus chrysurus*, d'Orb. & Lafr. Syn. Av. ii. p. 26.  
Chuquisaca (*Bonelli*, teste *Gould*); Yungas (*O.*).
348. *SAPPHO PHAON* (Gould); Gould, Mon. Troch. iii. pl. clxxv.  
*Ornismya chrysurus*, d'Orb. & Lafr. Syn. Av. ii. p. 27.  
La Paz, Sicasica (*O.*); Sapahaque, La Paz (*B.*).
349. *AGLEACTIS PAMELA* (d'Orb. et Lafr.).  
*Agleactis pamea*, Gould, Mon. Troch. iii. pl. clxxxi.  
*Orn. pamea*, d'Orb. & Lafr. Syn. Av. ii. p. 28.  
*Orthorhynchus pamea*, d'Orb. Voy. Ois. p. 375, pl. lx. fig. 1.  
Consata, Cillutincara, and Unduavi (*B.*); Tagesi, La Paz and Palca Grande, Ayupaya (*O.*).
350. *RHAMPHOMICRON OLIVACEUM*, Lawr. Ann. L. N. Y. viii. p. 45 (1847).  
Bolivia (*Lawrence*).
351. *RHAMPHOMICRON RUFICEPS* (Gould); Gould, Mon. Troch. iii. pl. clxxviii.  
Tilotilo (*B.*).
352. *METALLURA ÆNEICAUDA* (Gould); Gould, Mon. Troch. iii. pl. cxcii.  
Cillutincara (*B.*); Yungas (*Bridges*, teste *Gould*).

## 353. METALLURA SMARAGDINICOLLIS (d'Orb. et Lafr.).

*Ornismya smaragdinicollis*, d'Orb. & Lafr. Syn. Av. ii. p. 31.*Orthorhynchus smaragdinicollis*, d'Orb. Voy. Ois. p. 375, pl. lix. fig. 2.*Metallura smaragdinicollis*, Gould, Mon. Troch. iii. pl. cxcvi.

Tilotilo (B.); Cagapi near Yanacaché, Yungas and Palca, Ayupaya (O.).

## 354. ADELOMYIA INORNATA (Gould); Gould, Mon. Troch. iii. pl. cxcvii.

Tilotilo (B.).

## 355. PETASOPHORA SERRIROSTRIS (Vieill.).

*Ornismya petasophora*, d'Orb. & Lafr. Syn. Av. ii. p. 28.*Petasophora serrirostris*, Elliot, Ibis, 1877, p. 137.

Valle Grande (O.).

## 356. PETASOPHORA ANAIS (Less.); Gould, Mon. Troch. iv. pl. ccxxiv.

Tilotilo (B.).

## 357. PETASOPHORA CYANOTIS (Bourc.); Gould, Mon. Troch. iv. pl. ccxxviii.

Tilotilo (B.).

## 358. CHRYSOBRONCHUS VIRESCENS (Dumont); Gould, Mon. Troch. iv. pl. ccxxx.

*Trochilus viridis*, d'Orb. & Lafr. Syn. Av. ii. p. 32.*Polytmus virescens*, Elliot, Ibis, 1877, p. 142.

Mojos (O.).

## 359. PATAGONA GIGAS (Vieill.); Gould, Mon. Troch. iv. pl. ccxxxii.

*Ornismya gigantea*, d'Orb. & Lafr. Syn. Av. ii. p. 26.*Patagona gigas*, Elliot, Ibis, 1877, p. 134.

Cochabamba, La Paz, Chuquisaca (O.); La Paz and Chuquisaca (Bonelli, teste Gould).

## 360. HELIANTHEA VIOLIFERA (Gould); Gould, Mon. Troch. iv. pl. ccxxxix.

Consata, Tilotilo (B.).

## 361. HELIANGELUS AMETHYSTICOLLIS (d'Orb. et Lafr.).

*Orn. amethysticollis*, d'Orb. & Lafr. Syn. Av. ii. p. 31.*Orthorhynchus amethysticollis*, d'Orb. Voy. Ois. p. 376, pl. lx. fig. 12.

Tilotilo (B.); Yuracares (O.).

## 362. DIPHLOGENA IRIS (Gould); Gould, Mon. Troch. iv. pl. ccxlvii.

Eastern slopes of Andes of Illimani and Sorata (Warszewicz).

363. *DIPHLOGÆNA AURORA* (Gould); Gould, Mon. Troch. iv. pl. cclxviii.

Eastern slopes of Andes of Illimani and Sorata (*Warszewicz*).

364. *BOURCIERIA INCA*, Gould; Gould, Mon. Troch. iv. pl. ccliv. Coroico (*Warszewicz*); Tilotilo (*B.*).

365. *LAMPROPYGIA BOLIVIANA*, Gould; Gould, Introduction to Troch. p. 137; Elliot, Ibis, 1876, p. 57.

Tilotilo (*B.*).

366. *ERIOCNEMIS AURELIÆ* (Bourc.); Gould, Mon. Troch. iv. pl. cclxxxiii.

Apollo, Tilotilo (*B.*).

These specimens differ slightly from the true *E. aureliæ* in having the downy feathers of the tarsi pale brown instead of brown and white.

367. *ERIOCNEMIS GLAUPOIDES* (d'Orb. et Lafr.).

*Ornismya glaucopoides*, d'Orb. & Lafr. Syn. Av. ii. p. 27.

*Eriocnemis glaucopoides*, Elliot, Ibis, 1877, p. 136.

Valle Grande (*O.*).

368. *LEUCIPPUS CHIONOGASTER* (Tsch.); Gould, Introduction to Troch. p. 178.

Sorata, Tipuani, Tilotilo (*B.*).

369. *LEUCOCHLORIS ALBICOLLIS* (Vieill.).

*Ornismya albicollis*, d'Orb. & Lafr. Syn. Av. ii. p. 30.

*Leucochloris albicollis*, Elliot, Ibis, 1877, p. 30.

Yungas (*O.*).

370. *THAUMASIUS ALBIVENTRIS* (Less.).

*Ornismya albiventris*, d'Orb. & Lafr. Syn. Av. ii. p. 30.

*Thaumatias albiventris*, Elliot, Ibis, 1877, p. 138.

Mojos (*O.*).

371. *THAUMASIUS NEGLECTUS*, Elliot.

*Ornismya bicolor*, d'Orb. & Lafr. Syn. Av. ii. p. 30.

*Thaumatias neglectus*, Elliot, Ibis, 1877, p. 30.

Yungas, Moxos (*O.*).

372. *CHRYSURONIA JOSEPHINÆ* (Bourc. et Muls.); Gould, Mon. Troch. v. pl. cccxxvi.

Consata, Tilotilo (*B.*).

373. *CHRYSURONIA CHRYSURA* (Less.).

*Ornismya ruficollis*, d'Orb. & Lafr. Syn. Av. ii. p. 30.

*Chrysuronion chrysura*, Elliot, Ibis, 1877, p. 140.

Santa Cruz, Chiquitos (*O.*).

374. *HYLOCHARIS CYANEA* (Vieill.).*Ornismya cyanea*, d'Orb. & Lafr. Syn. Av. ii. p. 30.*Hylocharis cyanea*, Elliot, Ibis, 1877, p. 138.

Guarayos (O.).

375. *CHLOROSTILBON SPLENDIDUS* (Vieill.).*Ornismya aureiventris*, d'Orb. & Lafr. Syn. Av. ii. p. 28.*Chlorostilbon splendidus*, Elliot, Ibis, 1877, p. 136.

Moxos, Cochabamba (O.); Mizque (B.).

376. *CHLOROSTILBON PRASINUS* (Less.).*Ornismya mellisuga*, d'Orb. & Lafr. Syn. Av. ii. p. 30.*Chlorostilbon prasinus*, Elliot, Ibis, 1877, p. 139.

Yungas, Sicasica, Ayupaya (O.).

## Family PICIDÆ.

377. *PICUMNUS ALBOSQUAMATUS*, d'Orb. Voy. Ois. p. 380, t. lxiv. f. 2.

Rio de Tamanipaya, Prov. Yungas (O.); Tilotilo, Prov. Yungas (B.).

378. *CAMPEPHILUS TRACHELOPYRUS* (Malh.); ScL. Cat. Am. B. p. 332.

Apollo, Tilotilo (B.).

379. *CAMPEPHILUS BOLEI* (Wagler).*Picus atriventris*, d'Orb. Voy. Ois. p. 378, t. lxiii. f. 1.*Phlæoceastes boiei*, Cab. et Heine, Mus. Hein. iv. p. 97.

Provinces of Chiquitos and Valle Grande (O.).

380. *PICUS LIGNARIUS*, Mol.*Picus puncticeps*, d'Orb. Voy. Ois. p. 379, t. xlv. f. 1.*Picus lignarius*, ScL. Cat. A. B. p. 334.

Chaluani, Cochabamba (O.).

381. *PICUS CACTORUM*, d'Orb. Voy. Ois. p. 378, t. lxii. f. 2.

Chaluani and Chilon, Prov. Mizque (O.).

382. *CHLORONERPES FUMIGATUS* (d'Orb.); d'Orb. Voy. Ois. p. 380, t. lxv. f. 1.

Santa Cruz de la Sierra and Prov. Chiquitos (O); Tilotilo, Prov. Yungas (B.).

383. *CHLORONERPES MALHERBII*, ScL.*Picus nigriceps*, d'Orb. Voy. Ois. p. 380, t. lxv. f. 2.*Chloronerpes malherbii*, ScL. Cat. Am. B. p. 338.

Palca Grande, Prov. Ayupaya (O.).

## 384. CHLORONERPES RUFICEPS (Spix).

*Campias ruficeps*, Cab. et Heine, Mus. Hein. iv. p. 153.  
Simacu (B.).

## 385. CHLORONERPES RUBIGINOSUS (Sw.).

*Picus canipileus*, d'Orb. Voy. Ois. p. 379, t. lxiii. f. 2.  
Chupé, Prov. Yungas (O.); Tilotilo, Prov. Yungas (B.).

386. MELANERPES CRUENTATUS (Bodd.); Scl. Cat. Am. B. p. 341.  
Simacu (B.).387. HYPOXANTHUS ATRICEPS, Scl. et Salv. P. Z. S. 1876,  
p. 251.

*Hypoxanthus brevirostris*, Tacz. P. Z. S. 1874, p. 546 (?)  
Ramosani, Tilotilo (B.).

388. COLAPTES RUPICOLA, d'Orb. Voy. Ois. p. 377, t. lxii. f. 1.  
La Paz, Chuquisaca, Potosi (O.).

## Family MOMOTIDÆ.

## 389. MOMOTUS NATTERERI, Scl.

*Prionites brasiliensis*, d'Orb. & Lafr. Syn. Av. ii. p. 34.  
*Momotus nattereri*, Scl. Cat. Am. B. p. 262.  
Yungas (O.).

## 390. UROSPATHA MARTII (Spix).

*Prionites martii*, Spix, Av. Bras. ii. p. 46, t. 60.  
Apollo (B.).

## Family ALCEDINIDÆ.

## 391. CERYLE TORQUATA (Linn.).

*Alcedo torquata*, d'Orb. & Lafr. Syn. Av. ii. p. 34.  
Santa Cruz de la Sierra, Chiquitos (O.).

## 392. CERYLE AMAZONA (Lath.).

*Alcedo amazona*, d'Orb. & Lafr. Syn. Av. ii. p. 34.  
Chiquitos (O.).

## 393. CERYLE AMERICANA (Gm.).

*Alcedo americana*, d'Orb. & Lafr. Syn. Av. ii. p. 34.  
Chiquitos, Valle Grande (O.).

## Family TROGONIDÆ.

394. TROGON PERSONATUS, Gould, Mon. Trog. ed. ii. pl. 10.  
Tilotilo (B.).

395. *TROGON VARIEGATUS*, Spix ; Gould, Mon. Trog. ed. ii. pl. 19.

Tilotilo (*B.*).

396. *PHAROMACRUS ANTISIANUS*, d'Orb.

*Trogon antisianus*, d'Orb. Mag. de Zool. 1837, Ois. t. 85.

*Trogon antisianensis*, d'Orb. Voy. Ois. p. 381, t. lxvi. f. i.

*Pharomacrus antisianus*, Gould, Mon. Trog. ed. ii. pl. 2.

Prov. Yungas (*O.*).

#### Family GALBULIDÆ.

397. *GALBULA RUFOVIRIDIS*, Cab. ; Sci. Cat. Am. B. p. 266.

Bolivia, Chiquitos (*O.*). Mus. Paris.

398. *BRACHYGALBA MELANOSTERNA*, Sci. P. Z. S. 1855, p. 15.

Guarayos (*O.*). Mus. Paris.

#### Family BUCCONIDÆ.

399. *BUCCO CHACURU*, Vieill. ; Sci. Syn. Bucc. p. 12.

Tilotilo (*B.*) ; Yungas and Santa Cruz (*O.*). Mus. Paris.

400. *BUCCO STRIATIPLECTUS*, Sci. P. Z. S. 1853, p. 123, et Cat. Am. B. p. 271.

"*Chaunornis flammulata*, Verreaux," Mus. Paris.

Santa Cruz (*O.*). Mus. Paris.

401. *MALACOPTILA FULVOGULARIS*, Sci. P. Z. S. 1853, p. 123.

Tilotilo (*B.*).

402. *MONASA NIGRIFRONS* (Spix) ; Sci. Cat. Am. B. p. 274.

Bolivia (*Behn*, Mus. P. L. S.).

#### Family CUCULIDÆ.

403. *PIAYA CAYANA* (Linn.) ; Sci. Cat. Am. B. p. 321.

Juanani, Tilotilo (*B.*).

#### Family RAMPHASTIDÆ.

404. *RAMPHASTOS INCA*, Gould, Mon. Ramph. ed. 2, pl. x.

Chimoree, Yuracares (*Bridges*, teste *Gould*).

405. *RAMPHASTOS CULMINATUS*, Gould, Mon. Ramph. ed. 2, pl. xi.

Guanai, Tilotilo (*B.*).

406. *PTEROGLOSSUS CASTANOTIS*, Gould, Mon. Ramph. ed. 2, pl. xix.

Tilotilo (*B.*).

407. *ANDIGENA CUCULLATUS* (Gould); Gould, Mon. Ramph. ed. 2, pl. xxxix.

Tilotilo (*B.*); Cochabamba (*Bridges*, teste *Gould*).

408. *AULACORHAMPHUS DERBIANUS* (Gould); Gould, Mon. Ramph. ed. 2, pl. xliii.

Ronco, Yuracares (*Bridges*, teste *Gould*); Nairapi, Tilotilo (*B.*).

409. *AULACORHAMPHUS CÆRULEICINCTUS* (d'Orb.).

*Pteroglossus cæruleicinctus*, d'Orb. Voy. Ois. p. 382, t. lxvi. f. 2.

*Aulacorhamphus cæruleicinctus*, Gould, Mon. Ramph. ed. 2, pl. xlvii.

Chapaguaia, Tilotilo, Prov. Yungas (*B.*); Yanacache, Chupé and Irapana, Prov. Yungas (*O.*).

#### Family CAPITONIDÆ.

410. *CAPITO AURATUS* (Dumont); Marsh. Mon. Barb. pl. 64.

Pillon (*B.*).

411. *CAPITO VERSICOLOR* (Müller); Marsh. Mon. Barb. pl. 68.

Tilotilo (*B.*).

#### Family PSITTACIDÆ.

412. *ARA RUBRIGENIS*, Lafr. Rev. Zool. 1847, p. 65.

*Sittace lafresnagi*, Finsch, Papag. i. p. 394.

Bolivia (*O.* in Mus. Lugd.).

413. *ARA MILITARIS* (Linn.).

*Sittace militaris*, Finsch, Papag. i. p. 396.

Bolivian Andes (*Castelnau*, fide *Finsch*).

414. *ARA MACAO* (Linn.); Finsch, Papag. i. p. 398.

Santa Cruz de la Sierra (*Burmeister*, teste *Finsch*).

415. *ARA CHLOROPTERA*, Gray.

*Sittace chloroptera*, Finsch, Papag. i. p. 403.

Santa Cruz de la Sierra (*Burmeister*, teste *Finsch*).

416. *ARA ARARAUNA* (Linn.); Finsch, Papag. i. p. 410.

Santa Cruz de la Sierra (*Burmeister*, teste *Finsch*).

417. *ARA SEVERA* (Linn.); Scl. Cat. Am. B. p. 345.

Bolivia (*Bridges*, Mus. P. L. S.); Santa Cruz de la Sierra (*Burm.*, teste *Finsch*).

418. *ARA AURICOLLIS* (Cassin).

*Sittace auricollis*, Finsch, Papag. i. p. 423.

Bolivia (*Bridges*, Mus. Brit.); Santa Cruz de la Sierra (*Burm.*, teste *Finsch*).



419. *CONURUS ACUTICAUDATUS*, Vieill. ; Scl. Cat. Am. B. p. 347 ; Finsch, Papag. i. p. 450.

Bolivia (*Bridges*, Mus. P. L. S. et Brit.).

420. *CONURUS MITRATUS*, Tsch. ; Finsch, Papag. i. p. 461.

Consata (*B.*).

421. *CONURUS WEDDELLI*, Deville ; Finsch, Papag. i. p. 497.

Bolivia (*Bridges*, Mus. Brit.). Santa Cruz de la Sierra (*Burm.*, teste *Finsch*).

422. *CONURUS MOLINÆ*, Mass. & Souanc. ; Gray, List of Psitt. p. 40.

Bolivia (*Bridges*, Mus. Brit.) ; Tilotilo (*B.*).

423. *BOLBORHYNCHUS MONACHUS* (Bodd.) ; Finsch, Papag. ii. p. 114.

Bolivia (*Bridges*, teste *Finsch*).

424. *BOLBORHYNCHUS LUCHSI*, Finsch, Papag. ii. p. 121.

Bolivia (*Bridges*, Mus. Brit.).

425. *BOLBORHYNCHUS AYMARA* (d'Orb.) ; Finsch, Papag. ii. p. 125.

*Conurus aymara*, Scl. Cat. Am. B. p. 350.

Sorata (*B.*) ; Bolivia (*O.*).

426. *BOLBORHYNCHUS ORBIGNESIUS* (Bp.) ; Finsch, Papag. ii. p. 129.

Bolivia (*O.*, Mus. Par., et *Bridges*, Mus. Lugd.). Island of Puriti, Lake Titicaca (*Forbes*, Mus. P. L. S.).

427. *CHRYBOTIS FARINOSA* (Bodd.) ; Finsch, Papag. ii. p. 565.

Santa Cruz de la Sierra (*Burm.*, teste *Finsch*).

428. *CHRYBOTIS MERCENARIA* (Tsch.) ; Finsch, Papag. ii. p. 594.

Yungas (*O.*, Mus. Paris.).

429. *PIONUS MENSTRUUS* (Linn.) ; Finsch, Papag. ii. p. 441.

Pillon (*B.*).

430. *PIONUS MAXIMILIANI* (Kuhl) ; Finsch, Papag. ii. p. 448.

Santa Cruz de la Sierra (*Burm.*, teste *Finsch*).

431. *PIONUS TUMULTUOSUS* (Tsch.) ; Scl. in Rowley's Orn. Misc. iii. p. 8, pl. lxxxi.

Tilotilo (*B.*).

432. *PIONOPSITTA MELANOTIS* (Lafr.).

*Pionias melanotis*, Finsch, Papag. ii. p. 412.

Tilotilo (*B.*) ; Bolivia (*O.*).

## Family STRIGIDÆ.

433. *STRIX FLAMMEA*, Linn.

*Strix perlata*, d'Orb. & Lafr. Syn. Av. i. p. 9; d'Orb. Voy. Ois. p. 135.

Provinces of Santa Cruz de la Sierra, Chiquitos, Moxos, Yungas, &c. (O.).

434. *ASIO BRACHYOTUS* (Forster).

*Otus brachyotus*, d'Orb. & Lafr. Syn. Av. i. p. 9; d'Orb. Voy. Ois. p. 134.

High plateau of Bolivia (O.).

435. *BUBO MAGELLANICUS* (Gm.); d'Orb. & Lafr. Syn. Av. i. p. 9; d'Orb. Voy. Ois. p. 137; Sharpe, Cat. B. ii. p. 29.

Provinces of Chiquitos and Moxos (O.).

436. *SCOPS BRASILIANUS* (Gm.); Scl. & Salv. Ex. Orn. p. 102.

*Scops choliba*, d'Orb. & Lafr. Syn. Av. i. p. 8; d'Orb. Voy. Ois. p. 132.

Provinces of Chiquitos and Moxos (O.).

437. *PULSATRIX TORQUATA* (Daud.).

*Noctua torquata*, d'Orb. & Lafr. Syn. Av. i. p. 8; d'Orb. Voy. Ois. p. 126.

Santa Cruz de la Sierra (O.).

## Family FALCONIDÆ.

438. *CIRCUS CINEREUS*, Vieill.; d'Orb. & Lafr. Syn. Av. i. p. 7; d'Orb. Voy. Ois. p. 110.

Bolivia (O.).

439. *CIRCUS MACROPTERUS*, Vieill.; d'Orb. & Lafr. Syn. Av. i. p. 7; d'Orb. Voy. Ois. p. 112.

Prov. Chiquitos (O.).

440. *ASTURINA NITIDA* (Lath.).

*Astur nitida*, d'Orb. & Lafr. Syn. Av. i. p. 5; d'Orb. Voy. Ois. p. 95.

Prov. Chiquitos (O.).

441. *ASTURINA SATURATA*, Scl. & Salv. P. Z. S. 1876, p. 357.

Apollo, Tilotilo (B.).

442. *ASTURINA PUCHERANI*, Scl. & Salv. P. Z. S. 1869, p. 133, et Ex. Orn. p. 177, t. 89.

*Astur magnirostris*, d'Orb. & Lafr. Syn. Av. i. p. 5; d'Orb. Voy. p. 91.

Chiquitos (O.).

443. *BUTEOLA BRACHYURA* (Vieill.) ; Sharpe, Cat. i. p. 201.  
Tilotilo, Prov. Yungas (B.).

444. *BUTEO ERYTHRONOTUS*, King.

*Buteo tricolor*, d'Orb. & Lafr. Syn. Av. i. p. 6 ; d'Orb. Voy. Ois.  
p. 106, t. iii. f. 1, 2.

La Paz (O.).

445. *BUTEO UNICOLOR*, d'Orb. & Lafr. Syn. Av. i. p. 6 ; d'Orb.  
Voy. Ois. p. 109.

This seems to be a distinct species, judging from the single example in the Paris Museum.

Palca, Prov. Ayupaya (O.).

446. *BUTEOGALLUS NIGRICOLLIS* (Lath.).

*Buteo busarellus*, d'Orb. & Lafr. Syn. Av. i. p. 6 ; d'Orb. Voy.  
Ois. p. 103.

Provinces of Chiquitos and Moxos (O.).

447. *URUBITINGA ZONURA* (Shaw).

*Morphnus urubitinga*, d'Orb. & Lafr. Syn. Av. i. p. 4 ; d'Orb.  
Voy. p. 84.

Prov. Chiquitos (O.).

448. *URUBITINGA UNICINCTA* (Temm.).

*Astur unicinctus*, d'Orb. & Lafr. Syn. Av. i. p. 5 ; d'Orb. Voy.  
Ois. 93.

Santa Cruz de la Sierra (O.).

449. *URUBITINGA MERIDIONALIS* (Lath.).

*Buteo rutilans*, d'Orb. & Lafr. Syn. Av. i. p. 6 ; d'Orb. Voy.  
Ois. p. 104.

Provinces of Chiquitos and Moxos (O.).

450. *GERANOÆTUS MELANOLEUCUS* (Vieill.).

*Haliaetus melanoleucus*, d'Orb. & Lafr. Syn. Av. i. p. 3 ; d'Orb.  
Voy. p. 76.

Bolivia (O.).

451. *THRASAETUS HARPYIA* (Linn.).

*Harpyia destructor*, d'Orb. & Lafr. Syn. Av. i. p. 4 ; d'Orb.  
Voy. p. 81.

Prov. Moxos, Cochabamba and Santa Cruz de la Sierra (O.).

452. *ACCIPITER VENTRALIS*, ScL. ; ScL. & Salv. Ex. Orn. p. 25,  
t. xiii.

*Nisus striatus*, d'Orb. & Lafr. Syn. Av. i. p. 4 ; d'Orb. Voy.  
Ois. p. 88?

Territory of the Yuracares Indians (O.) ; Tilotilo, Prov. Yungas  
(B.).

## 453. ACCIPITER POLIOGASTER (d'Orb. &amp; Lafr.).

*Nisus polioaster*, d'Orb. & Lafr. Syn. Av. i. p. 4; d'Orb. Voy. Ois. p. 89.

Santa Cruz de la Sierra and Chiquitos (O.).

We have not seen Bolivian examples of this species.

## 454. MICRASTUR CONCENTRICUS (Lesson).

*Nisus concentricus*, d'Orb. & Lafr. Syn. Av. i. p. 4; d'Orb. Voy. Ois. p. 88.

Prov. Yungas (O.).

## 455. GERANOSPIZIAS HEMIDACTYLA (Temmm.).

*Nisus hemidactylus*, d'Orb. & Lafr. Syn. Av. i. p. 4; d'Orb. Voy. Ois. p. 86.

Prov. Chiquitos (O.).

## 456. HYPOTRIORCHIS FEMORALIS (Temmm.).

*Falco femoralis*, d'Orb. & Lafr. Syn. Av. i. p. 7; d'Orb. Voy. Ois. p. 116.

Provinces of Moxos and Chiquitos, environs of Chuquisaca (O.).

## 457. TINNUNCULUS SPARVERIUS (Linn.).

*Falco sparverius*, d'Orb. & Lafr. Syn. Av. i. p. 8; d'Orb. Voy. Ois. p. 119.

Provinces of La Paz, Chuquisaca, and Chiquitos (O.).

## 458. ELANOIDES FURCATUS (Linn.).

*Milvus furcatus*, d'Orb. & Lafr. Syn. Av. i. p. 5; d'Orb. Voy. Ois. p. 100.

Provinces of Moxos and Chiquitos (O.).

459. ICTINIA PLUMBEA (Vieill.); d'Orb. & Lafr. Syn. Av. i. p. 101; d'Orb. Voy. Ois. p. 101.

Tilotilo, Prov. Yungas (B.); Provinces of Chiquitos and Moxos (O.).

## 460. HARPAGUS BIDENTATUS (Lath.).

*Diodon bidentatus*, d'Orb. & Lafr. Syn. Av. i. p. 8; d'Orb. Voy. Ois. p. 122.

Mission de Santo Corazon, Prov. Chiquitos (O.).

## 461. HERPETOTHERES CACHINNANS, Vieill.

*Macagua cachinnans*, d'Orb. & Lafr. Syn. Av. i. p. 5; d'Orb. Voy. Ois. p. 96.

Provinces of Santa Cruz de la Sierra, Moxos, and Chiquitos (O.).

## 462. MILVAGO CHIMANGO (Vieill.).

*Polyborus chimango*, d'Orb. & Lafr. Syn. Av. i. p. 3; d'Orb. Voy. Ois. p. 60, t. ii. f. 3, 4.

Bolivia (O.).

## 463. MILVAGO CHIMACHIMA (Vieill.).

*Polyborus chimachima*, d'Orb. & Lafr. Syn. Av. i. p. 3; d'Orb. Voy. Ois. p. 63.

Santa Cruz and Chiquitos (O.).

## 464. MILVAGO MEGALOPTERUS (Meyen).

*Phalcobænus montanus*, d'Orb. & Lafr. Syn. Av. i. p. 2; d'Orb. Voy. Ois. p. 51, t. ii. f. 1, 2.

La Paz and Cochabamba (O.).

## 465. POLYBORUS THARUS (Mol.).

*Polyborus vulgaris*, d'Orb. & Lafr. Syn. Av. i. p. 3; d'Orb. Voy. Ois. p. 55, t. i. f. 2 (egg).

Bolivia (O.).

## Family CATHARTIDÆ.

466. CATHARTES AURA (Linn.); d'Orb. & Lafr. Syn. Av. i. p. 2; d'Orb. Voy. Ois. p. 38, pl. i. f. 2.

Provinces of Moxos and Chiquitos (O.).

## 467. CATHARTES ATRATUS (Bartr.).

*Cathartes urubu*, d'Orb. & Lafr. Syn. Av. i. p. 1; d'Orb. Voy. Ois. p. 31.

Bolivia (O.).

## 468. GYPAGUS PAPA (Linn.).

*Sarcorhamphus papa*, d'Orb. & Lafr. Syn. Av. i. p. 1.

Bolivia (O.).

469. SARCORHAMPHUS GRYPHUS (Linn.); d'Orb. & Lafr. Syn. Av. i. p. 1; d'Orb. Voy. Ois. p. 17.

Andes of Bolivia (O.).

## Family COLUMBIDÆ.

470. COLUMBA ALBILINEA (Bp.).

*Chlorænas albilinea*, Bp. Consp. ii. p. 51.

Ramosani, Tilotilo (B.).

## 471. COLUMBA PLUMBEA, Vieill.

*Chlorænas plumbea*, Bp. Consp. ii. p. 53.

Mapiri, Tilotilo (B.).

## 472. ZENAIDA MACULATA (Vieill.); Bp. Consp. ii. p. 82.

Huachapampa (B.).

473. METRIOPELIA AYMARA (Knip & Prév.); Bp. Consp. ii. p. 76.

Tacora (O.).

474. COLUMBULA PICUI (Temm.); Bp. Consp. ii. p. 80.

Scrata (B.).

475. CHAMÆPELIA CRUZIANA (Knip & Prév.); Bp. Consp. ii. p. 80.

Santa Cruz (O.).

476. LEPTOPTILA MEGALURA, sp. n.

*Supra læte brunnea, fronte alba verticem versus plumbea; capite postico et nucha, cervice postica et dorso antico vinaceis, illis rufescenti tinctis, his violaceo vix coruscantibus; subtus vinacea, facie tota, abdomine medio et crisso albis; caudæ rectricibus, nisi in duabus mediis, albo terminatis, subalaribus et remigibus intus (apicibus exceptis) læte cinnamomeis; rostro nigro, pedibus rubris. Long. tota 11.5, alæ 5.7, caudæ 4.7.*

*Hab.* Tilotilo, Prov. Yungas, Bolivia (Buckley).

*Mus.* S.-G.

*Obs.* *L. rufaxillæ* ex Peruvîâ et Amazoniâ affinis, sed staturâ majore, caudâ multo longiore, genis albidis nec violaceo tinctis, distinguenda.

This species belongs to the *L.-rufaxilla* section of the genus, in which the top of the head is ash-coloured. *L. rufaxilla* was originally based upon a Guiana bird; and to this species we refer specimens from Yquitos, on the Upper Amazons, and from the Cosnipata valley in Eastern Peru. The bird now described differs from these in its greater size, the greater length of the tail, and in having the face almost pure white. Buckley's collection contained two skins.

477. GEOTRYGON MONTANA (Linn.); Scl. & Salv. Ex. Orn. p. 79.

Apollo, Tilotilo (B.).

478. GEOTRYGON FRENATA (Tsch.); Scl. & Salv. P. Z. S. 1873, p. 785.

Simacu, Yuyo, Tilotilo (B.).

#### Family CRACIDÆ.

479. PENELOPE OBSCURA, Temm.; Sclat. & Salv. P. Z. S. 1870, p. 525.

Bolivia (Bridges).

480. PENELOPE SCLATERI, Gray; Scl. & Salv. P. Z. S. 1876, p. 527.

Bolivia (Bridges); Tilotilo (B.).

481. ORTALIDA GUTTATA (Spix); Scl. & Salv. P. Z. S. 1870, p. 537.

Tilotilo (B.).

## Family TETRAONIDÆ.

482. ODONTOPHORUS MARMORATUS, Gould, P. Z. S. 1843, p. 107.  
Yuyo (*B.*).

## Family RALLIDÆ.

483. PORZANA MELANOPHÆA (Vieill.); *Scl. & Salv. P. Z. S.* 1868, p. 453, et *Ex. Orn.* p. 107, t. liv.

Chiquitos (*O.*).

484. PORPHYRIOPS MELANOPS (Vieill.); *Scl. & Salv. P. Z. S.* 1868, p. 461.

Bolivia (*O.*, *Mus. Paris.*).

485. FULICA CORNUTA, Bp.; *Scl. & Salv. P. Z. S.* 1868, p. 463, et *Ex. Orn.* p. 120.

Potosi (*Cast. et Dev.*, *Mus. Paris.*).

486. FULICA ARDESIACA, Tsch.; *Scl. & Salv. P. Z. S.* 1868, p. 464, et *Ex. Orn.* p. 113, t. lvii.

Bolivian Andes (*O.*).

487. FULICA LEUCOPTERA, Vieill.; *Scl. & Salv. P. Z. S.* 1868, p. 468, et *Ex. Orn.* p. 117, t. lix.

Chiquitos (*O.*, *Mus. Paris.*).

## Family THINOCORIDÆ.

488. ATTAGIS LATREILLII, Lesson; Gray, *List of Gall.* p. 96.

Bolivia (*Bridges*, *Mus. Brit.*).

489. THINOCORUS ORBIGNIANUS, Geoffr. & Less.; *Scl. & Salv. P. Z. S.* 1867, p. 989.

Cinti (*B.*).

## Family SCOLOPACIDÆ.

490. GALLINAGO JAMESONI (Bp.); *Scl. & Salv. Ex. Orn.* p. 196.  
Cillutincara (*B.*).

491. TRINGA MACULATA (Vieill.); *Scl. & Salv. P. Z. S.* 1873' p. 455.

Tilotilo (*B.*).

## Family LARIDÆ.

492. LARUS SERRANUS, Tsch.; *Scl. & Salv. P. Z. S.* 1871, p. 577.  
Bolivia (*O.*).

## Family PODICIPITIDÆ.

493. PODICEPS CALLIPARIUS, Less.; *Scl. & Salv. Ex. Orn.* p. 190.  
Potosi (*O.*).

494. CENTROPHELMA MICROPTERUM (Gould); *Scl. & Salv. Ex. Orn.* p. 189, pl. 95.

Lake Titicaca (*Forbes*).

## Fam. TINAMIDÆ.

495. *CRYPTURUS OBSOLETUS* (Vieill.); Burm. Syst. Ueb. iii. p. 316.

Tilotilo (*B.*).

496. *CRYPTURUS RADIATUS* (Gray).

*Tinamus radiatus*, Gray, List of Gall. p. 100.

*Nothocercus scolopax*, Bp. Tabl. d. Gall. p. 18 (?)

Bolivia (*Bridges*, Mus. Brit.).

497. *RHYNCHOTUS MACULICOLLIS*, Gray, List of Gall. p. 102.

Bolivia (*Bridges*).

See *Bridges's* notes (P. Z. S. 1846, p. 9) in relation to this and other Tinamous of Bolivia.

498. *NOTHOPROCTA ORNATA* (Gray).

*Nothoprocta ornata*, Scl. & Salv. Nomencl. p. 153.

*Rhynchotus ornatus*, Gray, List of Gall. p. 102.

Bolivia (*Bridges*).

499. *NOTHOPROCTA PENTLANDI* (Gray).

*Nothoprocta pentlandi*, Scl. & Salv. Nomencl. p. 153.

*Rhynchotus pentlandi*, Gray, List of Gall. p. 103.

*Nothura punctulata*, Mus. Paris (partim).

Andes of Bolivia (*Pentland*, Mus. Brit.). Sicasica and Chiquitos (*O.*, Mus. Paris).

The specimens of this species in the Paris Museum are marked "*Nothura punctulata*, Gay"; but we consider *N. pentlandi* distinct, though nearly allied. *N. doeringi*, Cab. (J. f. O. 1878, p. 198) is a third species of the same group.

500. *NOTHURA MARMORATA*, Gray; Gray, List of Gall. p. 104.

Cinti (*O.*).

501. *TINAMOTIS PENTLANDI*, Vig. P. Z. S. 1836, p. 79; Gray & Mitch. Gen. B. t. 137.

Andes near Potosi (*Bridges*). Mus. Brit.

## APPENDIX.

List of Bolivian species mentioned by d'Orbigny but not identified by the authors of this paper:—

1. *Emberiza obscura*, d'Orb. & Lafr. Syn. Av. i. p. 81.

Prov. Chiquitos (*O.*).

2. *Emberiza uropygialis*, d'Orb. & Lafr. Syn. Av. i. p. 75.

Andes of Bolivia (*O.*).

<sup>1</sup> Gay, Hist. Phys. y Pol. de Chile, Zool. i. p. 391.



3. *Emberiza olivascens*, d'Orb. & Lafr. Syn. Av. i. p. 75.  
La Paz (O.).
4. *Icterus maxillaris*, d'Orb. & Lafr. Syn. Av. ii. p. 6; d'Orb. Voy. Ois. p. 367, t. lii. f. 2, 3. *Cyrtotes maxillaris*, Bp. Consp. i. p. 437.  
Cochabamba (O.).
5. *Icterus chrysopterus*, d'Orb. & Lafr. Syn. Av. ii. p. 5.  
Bolivia (O.).
6. *Popoaza montana*, d'Orb. & Lafr. Syn. Av. i. p. 64; d'Orb. Voy. Ois. p. 352.  
La Paz and Inquisivi, Prov. Sicasica, Palca, Prov. Ayupaya (O.).
7. *Muscisaxicola striaticeps*, d'Orb. & Lafr. Syn. Av. i. p. 66; d'Orb. Voy. Ois. p. 356, t. xli. f. 1.  
Environs of La Paz (O.).
8. *Muscicapa olivacea*, d'Orb. & Lafr. Syn. Av. i. p. 54. *Muscicapa boliviana*, d'Orb. Voy. Ois. p. 328.  
Prov. Yungas (O.).
9. *Muscicapa ventralis*, d'Orb. & Lafr. Syn. Av. i. p. 53. *Muscicapara ventralis*, d'Orb. Voy. Ois. p. 328.  
Territory of the Guarayos Indians (O.).
10. *Muscicapa obsoleta*, d'Orb. & Lafr. Syn. Av. i. p. 53. *Muscicapara obsoleta*, d'Orb. Voy. Ois. p. 328.  
Prov. Chiquitos (O.).
11. *Muscicapa stramineoventris*, d'Orb. & Lafr. Syn. Av. i. p. 53. *Muscicapara stramineoventris*, d'Orb. Voy. Ois. p. 327.  
Santa Ana, Prov. Chiquitos (O.).
12. *Muscicapa albicilla*, d'Orb. & Lafr. Syn. Av. i. p. 52. *Muscicapara gaimardi*, d'Orb. Voy. Ois. p. 326.  
Territory of the Yuracares Indians (O.).
13. *Muscicapa angustirostris*, d'Orb. & Lafr. Syn. Av. i. p. 52. *Muscicapara angustirostris*, d'Orb. Voy. Ois. p. 325.  
Prov. Yungas (O.).
14. *Muscicapa elegans*, d'Orb. & Lafr. Syn. Av. i. p. 52. *Muscicapa viridicata*, d'Orb. Voy. Ois. p. 325.  
Santa Corazon, Prov. Chiquitos (O.).
15. *Muscipeta querula*, d'Orb. & Lafr. Syn. Av. i. p. 47. *Muscipeta acadica*, d'Orb. Voy. Ois. p. 318.  
Mission de Santa Corazon, Prov. Chiquitos (O.).

16. *Muscipeta bimaculata*, d'Orb. & Lafr. Syn. Av. i. p. 48; d'Orb. Voy. Ois. p. 320.

Prov. Yungas (O.).

17. *Tyrannus fumigatus*, d'Orb. & Lafr. Syn. Av. i. p. 43; d'Orb. Voy. Ois. p. 307.

Irupana, Prov. Yungas (O.).

18. *T. rufescens*, d'Orb. & Lafr. Syn. i. p. 44.

Garayos (O.).

[This is a species of *Attila*; but we are not certain whether it is *A. thamnophiloides* or an allied species.]

19. *Certhilauda maritima*, d'Orb. & Lafr. Syn. Av. i. p. 72; d'Orb. Voy. Ois. p. 360, t. xlv. f. 1.

Cobija (O.).

20. *Upucerthia andecola*, d'Orb. & Lafr. Syn. Av. ii. p. 21; d'Orb. Voy. Ois. p. 371, t. lvi. f. 2.

Valley of La Paz, Inquisivi, Totora, and Valle Grande (O.).

21. *Anabates gutturalis*, d'Orb. & Lafr. Syn. Av. ii. p. 14.

Territory of the Yuracares Indians (O.).

22. *Anabates striaticeps*, d'Orb. & Lafr. Syn. Av. ii. p. 19; d'Orb. Voy. Ois. p. 254.

Prov. Sicasica (O.).

23. *Dendrocolaptes rectirostris*, d'Orb. & Lafr. Syn. Av. ii. p. 12.

Prov. Chiquitos (O.).

24. *Thamnophilus lafresnayanus*, d'Orb. & Lafr. Syn. Av. i. p. 13. *Formicivora lafresnayana*, d'Orb. Voy. Ois. p. 182, t. vi. f. 1.

Cochabamba (O.).

25. *Thamnophilus affinis*, d'Orb. & Lafr. Syn. Av. i. p. 12; d'Orb. Voy. Ois. p. 175.

Mission de Santa Ana, Prov. Chiquitos (O.).

26. *Cypselus montivagus*, d'Orb. & Lafr. Syn. Av. i. p. 70; d'Orb. Voy. Ois. p. 357, t. xlii. f. 1.

Las Habras Mountains between Samaypata and Santa Cruz de la Sierra (O.).

27. *Caprimulgus psalurus*, d'Orb. & Lafr. Syn. Av. i. p. 67.

Chiquitos (O.).

28. *Ornismya macrourus*, d'Orb. & Lafr. Syn. Av. ii. p. 26.

Chiquitos, Moxos (O.).

No specimen in Paris Museum, v. Elliot, Ibis, 1877, p. 134.

29. *Ornismya longirostris*, d'Orb. & Lafr. Syn. Av. ii. p. 29.

Guarayos (O.).

No specimen in Paris Museum (Elliot, l. c.).

30. *Noctua ferox*, d'Orb. & Lafr. Syn. Av. i. p. 8; d'Orb. Voy. Ois. p. 127.

Prov. Chiquitos (O.).

31. *Ibycter gymnocephalus*, d'Orb. & Lafr. Syn. Av. i. p. 2; d'Orb. Voy. Ois. p. 50.

Cochabamba (O.).

### 3. On the *Acanthomys leucopus* of Gray.

By EDWARD R. ALSTON, F.L.S., F.Z.S., &c.

[Received June 3, 1879.]

In the first part of Prof. Schlegel's new periodical, 'Notes from the Royal Zoological Museum of the Netherlands at Leyden,' Dr. F. A. Jentink identifies two specimens of a spiny Rat from Celebes with the North-Australian species described by the late Dr. Gray under the name of *Acanthomys leucopus*<sup>1</sup>. The specific identity of a *Mus* from Celebes with one from the continent of Australia seemed so unlikely that I suspected that Dr. Jentink might have been misled by Gray's very insufficient description; and I was consequently induced to reexamine the types in the British Museum. A comparison of the description given below with that of Dr. Jentink will show that the two species are evidently quite distinct, the Celebes animal being a fourth smaller than the Australian, with much smaller feet, and having the tail longer than the head and body, thinly haired and tufted, instead of shorter and naked.

In a note to my report on the Rev. G. Brown's collection, I remarked that Gray's species belonged to the restricted genus *Mus* and not to *Acanthomys*, Lesson (= *Acomys*, Geoffroy), and that it would require to be renamed, the specific name being preoccupied by the common North-American White-footed Mouse, the *Mus leucopus* (Rafinesque) of Desmarest and other writers, *Hesperomys leucopus* of more recent zoologists<sup>2</sup>. Dr. Jentink also places the Australian species in the genus *Mus*, but on different grounds; he rejects the genus *Acomys* or *Acanthomys* altogether, as being founded merely on the superficial character of the possession of spinous hairs. But that group was founded by the older Geoffroy on the *Mus cahirinus* of Desmarest; and it has been restricted by subsequent writers to the small group of Ethiopian *Mures* in which a spiny coat is combined with marked cranial peculiarities, notably with shallow pterygoid fossæ, very small incisive foramina and slightly developed coronoid processes<sup>3</sup>.

<sup>1</sup> P. Z. S. 1867, p. 598.

<sup>2</sup> P. Z. S. 1877, p. 124, footnote.

<sup>3</sup> Cf. Peters, Reise n. Mozambique, i. p. 161; Alston, P. Z. S. 1876, p. 83.

Although Dr. Jentink places the species in the genus *Mus*, he retains Gray's specific name on the ground that *Mus leucopus* (Raf.) has since been separated as a *Hesperomys*. In this I cannot agree; because a species has been removed to a new genus its name does not become unoccupied in the old one. Surely Dr. Jentink would not think it admissible to name a new Mouse *Mus aquaticus* because the Linnæan *Mus aquaticus* has been separated as an *Arvicola*? Nor can I see any analogy in his further suggestion that "if Alston objects to the name of this species he should also reject the name *Uromys rufescens*, and adopt the specific name *muscivora*, Pierson Ramsay, because, under the name of *Mus rufescens*, a Mouse was already described by Gray." The cases will only be parallel when Dr. Jentink can prove that my *Uromys rufescens*<sup>1</sup> is a true *Mus*, and does not belong to the perfectly distinct genus *Uromys*. When he has shown this I will readily withdraw my name in favour of Mr. Ramsay's.

The following is a fuller description than Gray's of the North-Australian Spiny Rat, which I propose to call

*MUS TERRÆ-REGINÆ*, sp. n.

*Acanthomys leucopus*, Gray, P. Z. S. 1867, p. 598 (descr. orig., vide suprâ).

*Mus leucopus*, Jentink, Notes fr. Leyden Mus. i. p. 8 (part., nec Desmarest).

Fur stiff and harsh both above and below, most of the hairs being developed into flattened channelled spines; on the back are many longer cylindrical hairs. Whiskers weak, not longer than the head, mixed black and white. Ears rather large, rounded, perfectly naked. Feet remarkably large and stout. Tail considerably shorter than the head and body, naked, the scattered minute hairs being hardly visible to the naked eye. Colour above dark reddish brown<sup>2</sup>, the spiny hairs being dusky, tipped with rufous, the longer hairs black; lips, lower parts of cheeks, chin, breast, belly, inside of limbs, and feet yellowish white<sup>3</sup>; tail dusky, irregularly marked with yellowish patches and rings.

Measurements of type specimens (*a*, an adult, and *b*, a young female):—

<i>a</i> .		in.	millims.
Length of head and body . . . .	8.25	=	210
„ tail . . . . .	7.10	=	180
„ ear . . . . .	.75	=	20
„ hind foot . . . . .	1.57	=	40

<sup>1</sup> P. Z. S. 1877, p. 124, pl. xviii.

<sup>2</sup> Not *greyish* brown as stated by Gray.

<sup>3</sup> The yellowish tinge may be due to the spirit in which the specimens are preserved.

	<i>b.</i>	in.	millims.
Length of head and body . . . .	7.10	=	180
„ tail . . . . .	6.30	=	160
„ ear . . . . .	.65	=	18
„ hind foot . . . . .	1.00	=	26

*Hab.* Cape York, Queensland (*Damen*, Mus. Brit.).

Dr. Jentink's Celebes Mouse, my *Mus browni* from Duke-of-York Island<sup>1</sup>, and *M. terræ-reginæ*, are all nearly related, although perfectly distinct; and allied species will doubtless be discovered in other parts of the Eastern Archipelago.

#### 4. On some African Species of the Lepidopterous Genus *Papilio*. By W. L. DISTANT.

[Received June 7, 1879.]

(Plate XLVII.)

The following short paper gives some notes taken during an examination recently made of the fine collection of African Papiliones in the collection of Mr. F. J. Horniman. Most of the West-African specimens have been obtained from the Calabar district (Isubu, Mongo-ma-lobah, Calabar); and these are peculiarly interesting as marking a district of which the insect fauna differs in many slight respects, though seldom specifically, from that of the neighbouring district of the Gold Coast. I have been forced to this conclusion not only from the examination of the Butterflies of this genus, but from having already worked out large collections of Hemiptera from the same locality, and from information supplied me by accomplished Coleopterists as to the insects of their own order. From Sierra Leone the divergence of the Calabar district is much greater, many insects being peculiar to each locality.

PAPILIO OPHIDOCEPHALUS, Oberthur, Études d'Entomologie, p. 13 (1878).

M. Oberthur has given the above name to the S.-African form figured by Trimen as *P. menestheus* (Rhop. Afr.-Austr. t. 2. f. 1). A long series in this collection from both S. and E. Africa shows the characters to be quite constant; and a ♀ *P. menestheus* from the Calabar district agrees with the typical characters of the ♂ of that species as figured by Drury.

PAPILIO HORNIMANI, n. sp. (Plate XLVII. figs. 1, 2 ♂, 3 ♀.)

♂. Wings above black, marginal fringe streaked with pale sulphur-yellow. Fore wings with a straight, oblique, transverse, green fascia, only divided by the nervules, extending from just inside lower apical portion of discoidal cell to about centre of interior margin. Above

<sup>1</sup> P. Z. S. 1877, p. 123.

this are three spots—one just inside upper apical portion of cell, another about same size parallel to it just outside cell and upper disco-cellular nervule, third and smallest immediately above second—and two subapical spots of the same colour situated between third, fourth, and fifth subcostal nervules. Lower wing crossed by a green transverse fascia in continuation of, but slightly broader than that of the fore wing, toothed externally, extending through and beyond apical third of cell to near centre of abdominal margin, where it is again somewhat narrower. A submarginal row of nine rounded green spots situated one below first subcostal nervule, two wide apart between second subcostal nervule and discoidal nervule, and the other six in pairs closer together divided by the median nervules.

Underside with the ground-colour and markings much as in *P. charopus*, West., but upper wings with a submarginal row of four large, crescent-shaped sulphureous patches, situated between the second discoidal nervule and the first, second, and third median nervules. Lower wings with a submarginal row of twelve bright sulphur-coloured spots, situated in pairs between the nervules, and two others of the same colour, one at anal angle and one near lower fourth of abdominal margin.

♀. Above generally as in ♂. Underside with the four submarginal, sulphureous, crescent-shaped patches to fore wings, but the spots on the hind wings very obscure.

Exp. wings, ♂  $4\frac{1}{2}$  in., ♀  $4\frac{8}{16}$  in.

*Hab.* Magila, East Africa.

Allied to *P. charopus*, West., from which it is at once distinguished by the narrow discal fasciæ above and the different and bright sulphureous markings beneath.

PAPILIO THERSANDER, Fab. Ent. Syst. iii. i. p. 32, n. 93 (1793); West. Arc. Ent. i. t. 38. f. 1, 2 (1842).

Mr. Kirby in his 'Catalogue Diurn. Lepid.' p. 563, places this species as the female of *P. phorcas*, Cram. Mr. Horniman's collection, however, contains two male and two female specimens of *P. thersander*; and therefore such cannot be the case. The females agree with Westwood's figure beneath better than above, the transverse macular band of the fore wings being much more broken than is portrayed in that figure. The male differs from the female in having all the macular markings pale yellow instead of creamy white. The male specimens are localized "Aburie, Accra." The female specimens have no locality affixed.

PAPILIO CYPRÆAFILA, Butl. Ent. Mo. Mag. v. p. 60 (1868).

*P. zenobia*, Don. Nat. Rep. v. t. 179 (1827); Luc. Léop. Ex. t. 24. f. 1 (1835).

All the specimens of the above species in this collection received from Isubu, Mongo-ma-lobah, and Calabar agree with the figure of Lucas and differ from that of Donovan (who records his specimen from Sierra Leone) in the smaller size of the marginal white incisures to the hind wings and also in the shape and size of the broken macular

## MYNES EUCOSMETOS, n. sp.

♀. Exp. 2·7 in. *Alis stramineo-albis, costa anticarum et marginibus externe nigris, margine ad apicem anticarum latiore et stramineo atomato, basi et marginibus nigris introrsum glauco tinctis. Subtus anticis basi, apice ipso, costa, et fascia arcuata, a costa ad angulum analem eunte, nigris; area discali et area subapicali albis, hac flavo tincta, macula ovali rufa in medio fasciæ nigræ marginem externum versus notata: posticis læte flavis nigro circumcinctis, introrsum vivide flavis et fascia arcuata limbo externo subparalleli notatis, linea angusta alba in limbo anali ipso, costa ad basin rufa, macula juxta eam, et altera angulum analem versus nigris notatis.*

This appears to be a very distinct insect: it differs from all the other described species in the extreme brilliancy of the markings of the underside.

PIERIS BAGOE, Boisd. Voy. Astr. Lép. p. 49.

*Pieris eurygania*, Godm. & Salv. P. Z. S. 1878, p. 734, and 1879, p. 159, t. 15. f. 5, 6.

Boisduval described a female *Pieris* in the Voyage of the 'Astrolabe' under this name, giving as its habitat "Port Praslin (Nouvelle-Hollande)," an evident mistake for "Nouvelle-Irlande." We think it undoubtedly the same as our *P. eurygania*, of both sexes of which we gave figures in our last paper.

## CALLIDRYAS CATILLA (Cram.).

A female of this widely ranging species from the Duke-of-York group of islands.

## PAPILIO CILIX, n. sp.

♂. Exp. 5·6 in. *P. albino similis, sed major et posticarum litura straminea aream mediam occupante multo augustiore et ad limbum internum producta, margine ejus extrorsum inter venas convexo, introrsum fere in linea recta ducto; macula ochraceo-rufa angulum analem versus, altera ultra eam minore notata: subtus posticis maculis septem albis in serie transeuntibus, quarum prima et ultima lunulatae sunt, aliis quinque subrotundis, lunulis quoque septem submarginalibus (ultima in finem marginis interni posita) ochraceo-rufis, lunulisque cyaneis, interioribus fere obsoletis; caudis majoribus et latioribus.*

♀ *mari similis, sed saturatior et litura posticarum latiore.*

In a former paper (P. Z. S. 1877, p. 148), we mentioned having received from Mr. Brown two imperfect specimens of a *Papilio* allied to *P. albinus*, which we thought might prove to be a distinct species. In the present collection there are more examples of this insect, which confirm this opinion; and we have therefore given it a specific name.

It differs from *P. albinus* in several important points: the posterior wings are more elongated, and the tails longer and broader; the

straw-coloured patch crossing the middle of the secondaries is much narrower, especially towards the inner margin, which it reaches in *P. ciliæ*; the outer margin of this patch is convex between the veins instead of concave; and the interior margin of the same patch is straight instead of curved; there is also a bright orange spot on the inner margin near the anal angle, and a second smaller one just beyond it. The female has the outer half of the patch on the secondaries of a dirty yellow colour, while the inner portion is nearly white. Our specimens are from New Ireland.

*PAPILIO ORITAS*, n. sp.

♂. Exp. 5·2 in. *P. ormeni* *simillimus*, sed *posticis*, presertim ad *ramum medianum tertium magis elongatis*, *litura grisea aream mediam occupante majore et margine introrsum recto nec concavo diversa*: *subtus posticarum lunula secunda apud angulum analem ochracea, serieque interiore lunularum cyaneurarum magis distinctis.*

♀ *mari similis*, sed *alis obscurioribus et squamis sparsis croceis tectis*, *anticarum fascia subapicali croceo tincta presertim marginem externum versus*; *posticarum margine interno lituræ griseæ eodem colore picto*: *subtus lunulis septem ochraceo-rufis, aliis fere obsoletis interioribus cyaneo notatis.*

We have now received four examples of this *Papilio*, three males and a female, from New Ireland. It is nearly allied to *P. ormenus*, from which, however, it differs in the following particulars:—The secondaries are much elongated, especially at the termination of the third median branch, where it is almost caudate; the inner margin of the grey patch on the secondaries in the male is straight instead of curved.

The female is like the male; but the wings are brown and covered with scattered scales of dull orange; the subapical band of spots crossing the primaries, with the exception of the spot nearest the costa, is tinged with the same colour; the interior margin of the grey patch is convex instead of concave, and towards its edge at the anal angle is rusty yellow; it has likewise a series of seven submarginal lunules of the same colour.

*PAPILIO PARON*, n. sp.

Exp. 3·3 in. *P. parmato similis* sed *alis magis productis*, *anticis fasciola alba obliqua ultra cellulam minorem, et fascia submarginali externa paulo latiore*; *posticis, griseo angulum analem versus angustiore*: *subtus croceus albo tincto, fasciola in costam per fasciam transversam mediam crocea eunte, tribus lunulis valde conspicuis eodem colore, ad terminum ejus, angulum analem versus, colore rubro omnino absente. Antennis nigris, prothorace croceo.*

This is a very distinct species, and, though similar to *P. parmatas* in the markings of the upper surface, may readily be distinguished from it by having three strongly marked orange spots at the end of the outer transverse black band towards the anal angle; and it has also the band itself towards the costa marked with the same colour,





Fig. 1.

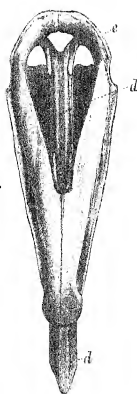


Fig. 2.

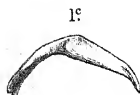
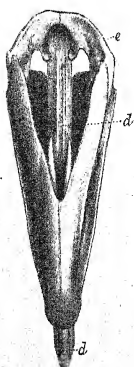


Fig. 3.



instead of with the red which is so conspicuous in *P. parmatius*. Our specimens are from New Ireland.

*PAPILIO BROWNI*, n. sp.

Exp. 4 in. *P. wallacei similis, sed paulo obscurior, anticis maculis intra cellulam majoribus, ea ad basin viridissima, duabus interioribus lineæ submedianæ angustioribus, maculis submarginalibus fere obsoletis; posticarum macula basali intra cellulam carente: subtus anticis maculis virescentibus et colore purpurascente in dimidio apicali absentibus; posticis maculis basalibus viridissimis, ea intra cellulam minutissima (fere obsoleta), lunulis rubris angulum analem versus majoribus.*

We have received a single female of this insect from New Ireland. The differences indicated in the foregoing description point out its specific distinctness from its close ally *P. wallacei*. Mr. Hewitson's figure of this latter species is taken from a New-Guinea specimen, and accurately agrees with an example sent us by Dr. Meyer, obtained by him in the same island (*cf.* Kirsch, *Mitth. d. k. zool. Mus. zu Dresden*, Heft ii. p. 113).

8. Observations on the Characters of the Echinoidea—II.  
On the Species of the genus *Tripneustes*, Agassiz. By  
F. JEFFREY BELL, B.A. Magdalen College, Oxford,  
Zoological Department, British Museum, F.Z.S.

[Received June 16, 1878.]

(Plate XLIX.)

It is with the greatest regret that I, in laying before the Society a few observations on another genus of the Echinoidea, find myself compelled at the outset to offer some remarks on the nomenclature adopted by Prof. Alex. Agassiz. No one who is engaged in the study of these complex and difficult forms can do otherwise than feel that he owes a great deal to the acuteness of the talented American naturalist; and his work will perhaps gain in value when it has been more subjected to working criticism than it has hitherto been.

As to the name which should be applied to the genus, Prof. Agassiz prefers to use the name *Hipponoë* (Gray) in place of *Tripneustes* (Agassiz); and he gives for this course reasons which I think deserve to be reprinted:—"In retaining the name *Hipponoë* of Gray, to which objections will undoubtedly be raised on the ground of *Hipponoa* having been before used by Audouin<sup>1</sup>, and from the fact of the name alone appearing without further indications of its connexion, I am simply carrying out the principle that *Hipponoë* and *Hipponoa*

<sup>1</sup> Audouin & Milne-Edwards, *Ann. Sc. Nat.* xx. (1830) p. 156.

are two very different<sup>1</sup> words, and that when specimens are accessible which have served as basis for any systematic work, their results should be accepted when correct, even when they upset a nomenclature generally recognized" ('Revision of the Echini' p. 301).

Let us now see the extent of the "appearance" of this name. In the year 1840 there was published the 42nd edition of the 'Synopsis of the Contents of the British Museum;' and on page 65 we find a list of the genera of the family of the 'Echinidæ,' among which stands the name *Hipponoë*. All that we have here is a mere list, with numbers appended to indicate the table-cases in which the specimens were to be found, and that under an arrangement long since altered: it is hardly worth while to inquire when; for in the year 1841, which (although apparently by a slip) is the year ascribed by Gray himself<sup>2</sup> to the publication (if so it may be called) of his name *Hipponoë*, Louis Agassiz put out, and thus defined, the name *Tripneustes*:—

"Le genre *Tripneustes* est caractérisé par trois rangées verticales et parallèles de doubles pores dans chaque demi-aire ambulacraire et par une rangée principale de tubercules aux bords internes des plaques interambulacraires. La collerette des piquans est très-développée et la baguette fortement sillonnée d'un bout à l'autre. Ces Oursins ont de profondes entailles au pourtour de l'ouverture inférieure du test. Il se pourrait que ce genre coïncidât avec le genre *Hipponoë* de Gray, qui n'est point décrit, mais simplement cité dans le Catalogue du Musée Britannique. Dans ce cas, le nom de M. Gray devrait être préféré au mien"<sup>3</sup>.

It has been a matter of some great difficulty to make out the history of this name. In the Bibliographical list of Alex. Agassiz ('Revision of the Echini'), the only references appended to the name *Tripneustes* are, "Int. Mon. Scut." (*sic*) and "C. R. Ann. Sc. Nat. vi.." The second reference is intelligible enough; and the first obviously refers to the 'Monographie des Scutelles,' published in 1841; but it is obvious that the Introduction, which deals with the "groupe des Scutelles en général," would only refer in the most incidental manner to so distant a form as *Tripneustes*; and it would have been convenient if Prof. Alex. Agassiz had given the page on which his father refers to this form: I have searched the pages of the Introduction in vain. Prof. Louis Agassiz seems to have believed that he first used it, definitely at any rate, in the preface to Valentin's 'Anatomie du genre *Echinus*' (*cf.* 'Nomina systematica generum Echinodermatum,' where we find *Tripneustes*, Agass. Monogr. Echin. 4<sup>e</sup> livr. 1841).

Since writing the above, which I let stand for the purpose of giving an idea of the difficulties which are found in our way, there has come into my hands an unbound copy of the four parts of the 'Monographies d'Echinodermes,' by which I find that in the 2de livraison, which contained the 'Monographie des Scutelles,' there was

<sup>1</sup> Different so far as that one is a "sense," and one a "nonsense" word, yet not so different but that *Hipponoë* is the French form of *Hipponoa*.

<sup>2</sup> Proc. Zool. Soc. 1855, p. 36.

<sup>3</sup> Valentin's 'Anatomie du genre *Echinus*,' p. viii of the Preface by L. Agassiz.

published a short essay entitled 'Observations sur les progrès récents de l'histoire naturelle des Échinodermes;' and there, on its seventh page, we find these words:—"Dans un travail encore inédit sur les espèces vivantes de l'ancien genre *Echinus*, travail que je me propose de publier prochainement, j'ai établi les coupes suivantes, dont je me bornerai à citer ici les types; . . . . . *Tripneustes* (*E. ventricosus*)" . . . . . I do not think that there is any need to particularize such a method of detailing the history of a name in a work which is entitled a 'Revision;' but I have thought it right, while giving an account of Prof. Alex. Agassiz's method of working out his subject, to give all the material necessary for other naturalists, who desire to investigate for themselves the matter in question. That there was some good cause for confusion is evident from the fact that no less eminent a naturalist, and careful a writer than Prof. E. von Martens put out the synonymy thus:—" *Tripneustes*, Ag. 1847; *Hipponoë*, Gray, 1841; non *Hipponoë*, Audouin et Milne-Edwards, 1834 (Annelid)"<sup>1</sup>. It will now be possible to write the synonymy thus:—

*Tripneustes*, L. Agassiz, 1841: p. viii of preface to Valentin's Anat. du genre *Echinus*. *Hipponoe*, Gray, 1855: P. Z. S. 1855, p. 36. *Heliechinus*, Girard, Proc. Boston Soc. of Nat. Hist. iii. p. 364 (fide Agassiz)<sup>2</sup>.

Having now dealt at an almost wearisome length with the vexed and vexatious question of the name proper to this genus, it is time to pass to the consideration of the species of which it is made up. In the 'Revision' three are recognized:—*T. depressus*, A. Ag., *T. esculentus*, Leske (this appears to be the correct name for *E. ventricosus*, Lamk.); and *T. variegatus*, Leske. I now come to some observations on the specific name *variegatus*; and I will put them briefly thus:—

(1) The name *variegatus* is never used by any writer on the genus *Tripneustes* subsequent to Leske and prior to Alex. Agassiz.

(2) The names synonymous with it in the opinion of Prof. Agassiz, *sardica* and *angulosa*, are also used by Leske: the former has been applied by Lamarck, de Blainville, Des Moulins, L. Agassiz, and Dujardin and Hupé, among others; while *angulosa* has been used by de Blainville, and by Dujardin and Hupé.

(3) The order in which these forms are described<sup>3</sup> will be shown by stating the pages on which they are found:—*Cidaris angulosa*, p. 92; *Cidaris sardica*, p. 146; *Cidaris variegatus*, p. 149<sup>4</sup>.

It is obvious that the name which *must* be used is *angulosus*; as to the other synonyms given by Agassiz in his list, they all appear to include forms which belong to this somewhat variable and widely distributed species.

The first species of the three, *depressus*, which has been found on

<sup>1</sup> Archiv für Naturges. xxxii, p. 160.

<sup>2</sup> Cf. Desor, 'Synopsis des Échinides fossiles,' Paris, 1858, p. 132.

<sup>3</sup> Additamenta ad Kleinii dispositionem Echinodermatum. N. G. Leske. Lipsiae MDCCCLXXVIII.

<sup>4</sup> *Variegata* is stated (Rev. Ech. p. 135) to be described on p. 85 of Leske's Additamenta: p. 85 is occupied by part of the description of *T. saxatilis*; and the word *variegata* is not to be found on it!

the eastern coast of America, was first described by Alex. Agassiz, and is distinguished by its form, its small anal system, and the presence of large plates on the buccal membrane, at the point where this structure unites with the test. In his definition of the form<sup>1</sup>, Agassiz states that "the anal system and the actinostome are comparatively smaller in the West Indian species." In support of this statement he gives, however, only one set of measurements for *T. depressus*; but they hardly bear out his proposition, inasmuch as in the specimen described by him, which had a long diameter of 127 mm., the anal system measured 9 mm. (giving a percentage value of 7.08), whereas the four values to be gained from his measurement of *H. esculenta* are respectively 15, 9.2, 8.1, and 7.9. The single specimen of *T. depressus* in the possession of the British Museum gives a percentage value of 6.6 (the anal system measuring 8 mm. and the long diameter 120 mm.). We might, indeed, imagine that a "than" had dropped out in the sentence just quoted, were it not that it does as it stands state fairly enough the comparative relations presented by the actinostome in the two forms therein mentioned. To this structure we will now turn. In Prof. Agassiz's specimens the actinal system measured 29 mm. (percentage value 22.8) in *H. depressa*, and 26.2 mm. (percentage value 22.2) in the largest specimen of *H. esculenta* of which he gives the measurements. The differences here are indeed not very great, but, such as they are, are evidence against Prof. Agassiz. As, however, my remarks are based rather on what I have been able to observe in the specimens in the national collection than on deductions from Prof. Agassiz's measurements, I am able to give in my adhesion to the statement already quoted, that the actinostome is smaller in the West-Indian species; for I find that while the British Museum specimen of *T. depressus* gives a percentage value of 25 for the actinostome, that of *T. esculentus* does not exceed 23.2, and may fall as low as 18.8 per cent.

*T. esculentus* and *T. angulosus*.—The diagnoses of Prof. Alex. Agassiz are notoriously difficult; but, so far as an attentive study of his remarks on these two species are of value, they appear to me to be convertible into the following propositions:—

The species *T. angulosus* is distinguished from the West-Indian *T. esculentus* by the following points:

- (i.) The tubercles are smaller in size and less in number.
- (ii.) The anal system is comparatively very large.
- (iii.) The abactinal system is more circular and less pentagonal, owing to the smaller size of the genital plates.
- (iv.) The poriferous zone is much narrower.
- (v.) The actinostome is larger.
- (vi.) The spines are much more slender.
- (vii.) The anal plates are smaller and more numerous.

The descriptions are marred by a very remarkable misprint, which states in effect that the specimens of *angulosus* measured by Prof. Agassiz have a height nearly twice as great as their long

<sup>1</sup> Revision of the Echini, p. 500.

diameter. Taking note of this lapse, we will first consider those statements regarding the species in which the results to be gained from an examination of the British-Museum specimens are not in complete accordance with the deductions of Prof. Agassiz:—

(1) *Comparative breadth of the poriferous zone.*—Prof. Agassiz states (p. 501, s. v. *H. variegata*) that “the poriferous zone is also much narrower.” As I found that my own measurements reversed the relation, and led me to the conclusion that it was in *T. esculentus* that the zones were narrower, I have been at the trouble of reducing the figures in the ‘Revision’ to a percentage value; and I find them to be

For “*H. esculenta*,” 10, 8·3, 8·9, 7·7.

For “*H. variegata*,” 9·6, 8, 7.

Pruned of its epithet “much” the statement of Agassiz is supported by his data. The British-Museum specimens, which I have measured, do not exhibit so great a range of variation in the width of the poriferous zone, as may be seen from the appended list:—

*T. angulosus*, 8, 8·2, 8·2, 8·6, 8·9, 9, 9.

*T. esculentus*, 7·8, 8, 8·4, 8·5.

These observations indicate that the poriferous zones are rather narrower in *T. esculentus* than in *T. angulosus*; but they really run so close that it seems to me that it is impossible to find in this character any constant or valuable point by which the two species may be distinguished.

(2) *Characters of the actinostome.*—The relative size of the actinostome in *Tripneustes angulosus* as compared with that of *T. esculentus* is one of the few points of difference to which it is, as a rule, easy to point. In connexion with it there is another character, which it is perhaps safest to speak of as a tendency: in *T. angulosus* the actinal surface is, as a rule, perfectly flat, and the actinostome is flush with it, whereas in *T. esculentus* that same surface is ordinarily a little swollen, and the actinostome is placed in a shallow concavity.

(3) *The anal system.*—It is interesting to compare the data afforded by the specimens of *T. esculentus* in the British Museum with those given by Prof. Agassiz. These latter are respectively 7·9, 8·1, 9·1, 9·2; those which are now given in the Table appended are 6·6, 7, 7·4, and 8; and they are to the point as leading us to insist a little more strongly on the comparatively smaller size of the anal system in *T. esculentus* than we should be justified in doing from a knowledge of Prof. Agassiz’s measurements alone.

(4) *Difference in the size and number of the tubercles.*—This appears to be a good character; but we must insist upon the fact that specimens of *T. esculentus* will be met with which have the median primary tubercles of the abactinal surface largely absorbed, while, on the other hand, there is in the Museum a young specimen which in the characters of its actinal and abactinal systems approximates to *T. angulosus*, but in which we find considerably well developed tubercles in the median spaces of the interambulacral areas. In

addition to this it is to be borne in mind that there is now valuable evidence as to the fact that tubercles may, and do, undergo absorption<sup>1</sup>; so that we must not insist upon this character, where others point to the contrary species as being in our hands.

(5) *Ocular plates*.—I had hoped that these structures would present some constancy of arrangement, which would be of assistance in the discrimination of the species, inasmuch as in the great majority of specimens of *T. esculentus* two only of the ocular plates reach to the anal system (or, in other words, are not shut out from it by the meeting of the edges of the genital plates): thus of six examples all but one presented the arrangement just described, while the sixth had four ocular plates directly adjacent to the anal system. *T. angulosus* presented no such constancy; for out of nine examples there were five that had two plates touching the anal system, while the others had three plates occupying a similar position. No conclusions can, therefore, be drawn from this character.

Characteristic as is the arrangement of the pores in *Tripneustes*, it is only of assistance in the definition of the genus; when we come to any close examination we find, as indeed we might expect from what we know as to the mode of their development, that the arrangement of the pairs of pores with relation to one another varies considerably. I have noticed in large specimens of *T. esculentus* that the inner row of pores is quite regular, while the outer row is, as compared with it, irregular; in the smallest specimens the two flanking rows of pores exhibit very remarkable regularity, following one another in quite straight lines.

The specimens exhibiting a pentagonal aspect come in very large quantities from the Red Sea; but there is in the Museum a specimen from the Philippines in which this form of test is just as well marked as in any Red-Sea specimen.

There are some slight differences in the characters of the component parts of the dentary apparatus (lantern of Aristotle), which I will now proceed to indicate:—

In *T. angulosus* the epiphysis is arched and its upper edge is bevelled; the tooth is connected with the alveolus by delicate, but not very short, ascending and descending processes; the rotulae are short and broad; and the radii end in two short processes.

In *T. depressus* the epiphyses are arched in very much the same manner as in *T. angulosus*; the inferior ascending processes are of much the same character, but the superior processes are much shorter; the radius is broadened out at its free end, but there is only a slight indentation at its extreme edge.

In *T. esculentus* the epiphysis is less strongly arched, and its upper edge is not so sharply bevelled; the tooth is connected with its alveolus by short pieces, which, above, are set nearly perpendicular to it; the inferior ones are only just seen through the triangular space, or, in other words, extend hardly at all upwards; the rotulae are rather more delicate; and the free end of the radius is distinctly

<sup>1</sup> Vide Rev. of the Echini p. 265, *Arbacia punctulata*.



bifurcate, so that the two processes thereby formed are longer than in *T. angulosus*.

The species of the genus may now be briefly defined:—

*T. angulosus*.—Test varying greatly in form and colour, the spines short and generally white; in the majority of specimens there are well-marked bare spaces in both ambulacral and interambulacral areas; there are distinct though delicate and short ascending and descending processes connecting each tooth with its alveolus; and the radii terminate in two shorter processes. The poriferous zones are wider, the actinal system larger, and the anal and abactinal systems more extensive than in *T. esculentus*. The species has been found in the Red Sea, Mauritius, the Cape of Good Hope, Rodriguez, the Philippines, and at Cayenne.

*T. esculentus*.—The test is generally rounded and more constantly white or pinkish in colour; the spines, which are white, are longer than in *T. angulosus*; and the median spaces in the ambulacral and interambulacral areas are ordinarily occupied by tubercles of some size; the pieces connecting each tooth with the alveolus are shorter and more horizontal in direction; and the two processes of the radii are longer than in *T. angulosus*, while the poriferous zones are narrower, the actinal system smaller, and the anal and abactinal systems less extensive than in *T. angulosus*.

As I have only seen one specimen of *T. depressus*, it will perhaps be best to leave the statements which I made regarding it as they stand in the body of the paper.

I append a list of the localities from which the Trustees of the British Museum have received specimens.

#### TRIPNEUSTES ANGULOSUS, Leske.

- a. Gulf of Suez; with some spines; pentagonal in shape.
- b. Red Sea.
- c. "Mauritius."
- d. "Isle of France;" with spines.
- e. Cape of Good Hope; with spines.
- f. Isle of Masbate.
- g. Philippines.
- h. Reef of Oomaga; with spines.
- i. Rodriguez; with spines.
- j. Cayenne<sup>1</sup>.

#### TRIPNEUSTES ESCULENTUS.

- a. Nassau, New Providence, W. I.
- b. West Indies; with spines.

#### TRIPNEUSTES DEPRESSUS.

- a. Gulf of California; with spines.

<sup>1</sup> This is a most remarkable locality, and I suspect very strongly that it is a slip for *Cayor*; but even in that case the locality is one from which the species has not yet been recorded.

Measurements of *Tripneustes esculentus*.

No.	Locality.	Absolute diam. in millims.	Percentage value of				
			Height.	Abac-tinal system.	Anal system.	Actinal system.	Pori-ferous zone.
1.	West Indies .....	68	51.4	12.5	6.6	25	...
2.	Nassau (New Providence).....	141	63.8	14.9	7	18.8	7.8
3.	Ditto .....	148	50	13.5	7.4	19	8.4
4.	? .....	100	45	12.2	...	23.2	8.5
5.	? .....	110	56.3	16.3	8	23	8
6.	A. Ag. i. <sup>1</sup> .....	28.5	53.3	20.3	10.5	35	10.1
7.	A. Ag. iv. <sup>1</sup> .....	118	56.7	16	9.2	22.2	7.7

Measurements of *Tripneustes angulosus*.

No.	Locality.	Absolute diam. in millims.	Percentage value of				
			Height.	Abac-tinal system.	Anal system.	Actinal system.	Pori-ferous zone.
1.	Masbate .....	29	55	17.25	8.6	34.5	8.6
2.	Masbate .....	67	49	16.4	.....	29.8	8.2
3.	Masbate .....	77	54.5	15.5	.....	24.6	9
4.	Gulf of Suez .....	89	57.2	15.7	10	25.3	8
5.	Gulf of Suez .....	100	56	18.5	10	26	9
6.	Gulf of Suez .....	109	53.2	17.4	10.5	26.2	8.2
7.	Cayenne.....	58	60	14.6	...	28.4	9.5
8.	? .....	95	52.6	17.9	7.9	25.2	9.4

## EXPLANATION OF PLATE XLIX.

Dentary Apparatus of *Tripneustes*.

Fig. 1. A pyramid of *T. angulosus*, showing *d*, the tooth, *e*, the epiphysis.

2. Ditto of *T. esculentus*.

3. Ditto of *T. depressus*.

1 *a*. Side view of alveolus of a pyramid of *T. angulosus*, with *e*, the epiphysis, *d*, the tooth.

2 *a*. Ditto of *T. esculentus*.

3 *a*. Ditto of *T. depressus*.

1 *b*, 2 *b*, 3 *b*. Rotulae of the three species.

1 *c*, 2 *c*, 3 *c*. Side view of radii.

1 *d*, 2 *d*, 3 *d*. Free terminal portion of the radii.

<sup>1</sup> I add two measurements from Prof. Agassiz for the purpose of comparison; it will be seen that the second set agree very well with my results.

November 18, 1879.

Prof. W. H. Flower, LL.D., F.R.S., President, in the Chair.

The Secretary read the following reports on the additions made to the Society's Menagerie during the months of June, July, August, and September 1879:—

The total number of registered additions to the Society's Menagerie during the month of June was 192, of which 38 were by birth, 54 by presentation, 78 by purchase, 21 were received on deposit, and 1 by exchange. The total number of departures during the same period by death and removals was 119.

The most noticeable additions during the month of June were as follows:—

1. A Spotted-billed Toucanet (*Selenidera maculirostris*), from Rio, Brazil, purchased June 14.

The receipt of this specimen, which is the first of this Toucan that has reached us, has raised the number of species of the group now represented in our collection to seven, namely:—

1. Toco Toucan, *Ramphastos toco*.
2. Red-billed Toucan, *Ramphastos erythrorhynchus*.
3. Sulphur-and-white-breasted Toucan, *Ramphastos vitellinus*.
4. Cuvier's Toucan, *Ramphastos cuvieri*.
5. Ariel Toucan, *Ramphastos ariel*.
6. Sulphur-breasted Toucan, *Ramphastos carinatus*.
7. Spotted-billed Toucanet, *Selenidera maculirostris*.

2. Two Tuatera Lizards (*Sphenodon punctatus*<sup>1</sup>), purchased June 24th.

These specimens were obtained from the island of "Karewa," a barren scoria rock off the harbour of Tauranga, Bay of Plenty, New Zealand, by Captain Fairchild, of the Government steamer 'Hime-moa,' about Dec. 1 to 15, 1878, and were brought to this country by Mr. Josiah Martin, of Auckland, New Zealand.

*Sphenodon punctatus* appears to be still found in several of the rocky islets in the Bay of Plenty, whereas the second species of Tuatera (*Sphenodon guentheri*, Buller, Trans. N. Z. Inst. ix. p. 324) seems to be confined to the Brothers Islands in Cook's Straits.

The registered additions to the Society's Menagerie during the month of July were 109 in number; of these 45 were acquired by presentation, 35 by purchase, 5 by exchange, 17 by birth, and 7 were received on deposit. The total number of departures during the same period by death and removals was 112.

The most noticeable additions during the month were:—

1. A Funereal or Yellow-eared Cockatoo (*Calyptorhynchus fune-*

<sup>1</sup> Dr. Gray, when he showed the identity of *Hatteria* and *Sphenodon* (Ann. N. H. ser. 4, vol. iii. p. 168), made the latter term neuter, and called this animal *Sphenodon punctatum*. But δὲων is simply an old form of δόων, and is properly masculine.

reus), from New South Wales, purchased July 16th, being the first example of this fine Parrot that has reached us alive.

2. A young pair of the Mule Deer of North America (*Cervus macrotis*), obtained through the valuable assistance of Dr. J. D. Caton, C.M.Z.S., and received July 18th. These Deer were the pets of Messrs. H. H. Carter and E. N. Carter, of Wyoming Territory, U.S.A., and were kindly parted with in aid of the Society's efforts to introduce this remarkable species of Deer into Europe.

The total number of registered additions to the Society's Menagerie during the month of August was 137; of these 54 were acquired by presentation, 39 by purchase, 23 by birth, 13 were received on deposit, and 8 in exchange. The total number of departures during the same period by death and removals was 115.

The most noticeable additions during the month were:—

1. A Bush-Dog (*Iticcyon venaticus*), from British Guiana, presented by J. E. Tinné, Esq., August 20th.

Mr. Tinné has kindly sent me the following notes upon this peculiar animal, which is quite new to the collection:—

"The Bush-Dog came from Dunoon, on the Hyama Creek, a tributary of the Demerara river, British Guiana. Dunoon is just above the Sand Hills, and is a wood-cutting block of high land, covered with wallaba, green-heart, and mora trees. The mother was shot by our tenant Señor Lopez de Faubra on the creek; and he secured a pair of the puppies for me, of which one unfortunately died in Georgetown before I left the colony last May. I fed them on raw meat. I believe these animals hunt in packs by scent, and are exceedingly savage; they take to the water readily. They are very seldom seen, and never frequent the low coast-lands, where our sugar-estates lie."

2. An Indian Otter (apparently *Lutra nair*), from Rangoon, purchased August 27th.

The total number of registered additions to the Society's Menagerie during the month of September was 93; of these 53 were acquired by presentation, 24 by purchase, 1 by exchange, 2 were bred in the Gardens, and 13 were received on deposit. The total number of departures during the same period by death and removals was 91.

The following extracts from a letter addressed to the Secretary by Mr. Henry O. Forbes, dated "Kosala, Bantam, W. Java, July 27, 1879, were read:—

"The following note as to the distribution of the Badger-headed Mydaus (*Mydaus meliceps*), called by the Sundanese "Sigoeng" (Dutch spelling), may not be without interest.

"Horsfield says that this species 'is confined exclusively to those mountains which have an elevation of more than 7000 feet above the surface of the ocean. There it occurs with the same regularity as

many plants. The long extended surface of Java, abounding with isolated volcanoes with conical points which exceed this elevation, affords many places favourable to its resort.'

"My present residence is about 2000 feet above the sea. Many, many times, especially in the evening just after dusk, the *Mydaus* has discovered its proximity to us by its extremely disagreeable and peculiar odour. So powerful indeed is this that natives attempting to catch these animals, often fall down insensible if struck by the discharge from their anal battery. Even at a distance of half a mile and more the stink, as I must call it, permeates the atmosphere so thickly that it is plainly discernible by the taste. None of the mountains in this neighbourhood rise over 4000 feet. I have found the burrows of the *Mydaus* at 2400 feet. At Tjipanas (Bantam), at an elevation of 850 feet, it is abundantly to be found—at Djasinga also, which is lower still, as well as at Buitenzorg, 750 feet above sea-level. It has also been found in considerable numbers at lower elevations, between Djasinga and the coast. I am informed, but cannot vouch for its being a fact, that its eastward limit is Cheribon. From this it would appear that the habitat of the *Mydaus* is now much lower than in the time of Horsfield, if his observation was correct. Sir Charles Lyell<sup>1</sup> thus explains its strange distribution:—'Before the island was peopled by man, by whom their numbers are now thinned, they may occasionally have multiplied, so as to be forced to collect together and migrate, in which case, notwithstanding the slowness of their motions, some few would succeed in reaching another mountain some 20 or even 50 miles distant; for although the climate of the hot intervening plains would be unfavourable to them, they might support it for a time, and would find there abundance of insects, on which they feed.'

"Now that the forests are being more and more cut down one would have expected no downward movement, at least of this peculiar animal, which is as much persecuted as ever. The temperature of Buitenzorg, for instance, is not many degrees lower than that of the plain in which Batavia stands, and is certainly now warmer than it was in past times, when almost impenetrable forests covered the whole district.

"Therefore to find the *Mydaus* so frequently at so low an elevation is a fact we have thought worth recording, because either it can sustain a greater degree of heat than was supposed by Horsfield, or it has now accommodated itself to a lower elevation."

Mr. Edward R. Alston exhibited, on behalf of Mr. R. G. Wardlaw Ramsay, 67th Regiment, a few specimens of Mammals from Afghanistan and Burmah. Of these one was an example of *Pteromys fimbriatus*, Gray, killed on the Peiwar Kotal in July 1879; this species had hitherto been only known from the Himalayas. Another was a Burmese skin of *Herpestes auropunctatus*, Hodgson

<sup>1</sup> Principles of Geology, ii. 362 (1872).

an animal which is not included in Blyth's posthumous fauna of that country<sup>1</sup>. On exhibiting a specimen of *Paradoxurus musanga* (Raffles), Mr. Alston observed that the *P. fasciatus* of Gray<sup>2</sup> proved to be a synonym of that well-known species, and had nothing whatever in common with the *Fiverra fasciata* of either Gmelin<sup>3</sup> or Desmarest<sup>4</sup>. Mr. Wardlaw Ramsay intended to present these specimens to the British Museum.

Mr. Alston also exhibited one of the typical skulls of *Tapirus dowi* (Gill)<sup>5</sup>, which had been intrusted to him by the authorities of the United-States National Museum, and pointed out the osteological characters which distinguish it from *T. bairdi* (Gill)<sup>6</sup>. Mr. Alston hoped to be able to fully describe and figure the skull of *T. dowi* in a future part of Messrs. Godman and Salvin's 'Biologia Centrali-Americana,' but wished now to place on record the fact that the young Tapir from Corinto, which lived in the Society's Gardens under the name of *T. bairdi*<sup>7</sup>, was really referable to *T. dowi*, as was also a skull from Volcan Viejo, presented by Mr. Sclater to the British Museum<sup>8</sup>. Mr. Alston further remarked that Dr. Gill had been misinformed as to the young of *T. dowi* not being spotted, but thought it probable that the adult would prove to want the rufous colour on the cheeks which is characteristic of Baird's Tapir. The range of the two species required further investigation; but *T. dowi* might prove to be confined to the Pacific slopes of Guatemala and Nicaragua.

The following extract was read from a letter addressed to the Secretary by Dr. A. B. Meyer, C.M.Z.S.:—

"Concerning the locality of *Cervus alfredi*, I wrote to my friend Mr. Oscar Bruger, who lived five years in Cebu, and who told me a short time ago, on his return to Europe, that he knew the habitat of this Deer; and I received this answer:—

"'An Indian friend of mine in Cebu, who lived formerly for years in Samao and Leyte, visited these islands again, and brought an example of this Deer back from there, and presented it to Mr. Bruger.'"

The Secretary exhibited on behalf of Mr. Rowland Ward a head of a Chamois (*Rupicapra tragus*) with two pairs of horns, the hinder pair being the smaller. The specimen in question had been purchased by Captain Towneley Parker at Nuremberg.

<sup>1</sup> Journ. As. Soc. Beng. (n. s.) vol. xliii. pt. 2.

<sup>2</sup> P. Z. S. 1864, p. 536; Cat. Carn. &c. Mamm. Brit. Mus. p. 68.

<sup>3</sup> Linn. Syst. Nat. i. p. 92 (1788, ex Sonnerat).

<sup>4</sup> Nouv. Dict. d'Hist. Nat. vii. p. 169 (1817, descr. orig.).

<sup>5</sup> *Elasmognathus dowii*, Gill, Amer. Journ. Sc. i. p. 142 (1870, descr. orig.).

<sup>6</sup> *Elasmognathus bairdii*, Gill, Proc. Acad. Philad. 1865, p. 183 (descr. orig.).

<sup>7</sup> Sclater, P. Z. S. 1872, p. 635, pl. li.; List Vert. An. Zool. Soc. (1879) p. 115, no. 399 b.

Cf. P. Z. S. 1867, p. 473.

Prof. Flower exhibited the skull of a Beluga, or White Whale, *Delphinapterus leucas* (Pallas), which has been presented by His Grace the Duke of Sutherland to the Museum of the Royal College of Surgeons, and made the following remarks:—

As this cetacean has been but rarely observed in the British seas, and as there is but one known instance in which a specimen has been taken alive and authenticated by preservation of its remains<sup>1</sup>, the circumstances relating to its capture, as described in a letter from the Rev. Dr. Joass, of Golspie, may be worth recording:—

“It was found close to the salmon-nets near the Little Ferry, about three miles to the westward of Dunrobin, Sutherlandshire, at ebb tide, on Monday, June 9th, 1879, caught by the tail between two short posts to which a stay-rope of the stake-net was fastened (see fig. 1); and a Salmon of 18 lb. weight, which was supposed to have been the object of its pursuit, was found in front of it. It measured 12 feet 6 inches in length. The tail was 34 inches across, and the flippers 17 inches long. It was a female, and had 20 teeth in the

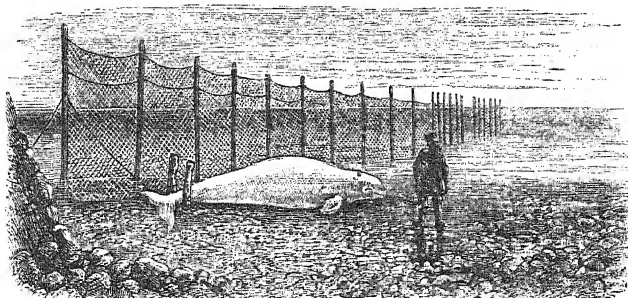


Fig. 1. The mode in which the Beluga was caught. From a sketch by the Rev. Dr. Joass.

upper jaw and 16 in the lower. The stomach contained a few flakes of fish, which from size and colour might have been Salmon. It was found, on cleaning the skeleton, that in its efforts to escape the Whale had broken its back between the third and fourth lumbar vertebræ; and it had a recent granulating wound on the frontal pad, extending about five inches transversely, and about three inches broad, the lower edge being on a line between the eyes. I have heard since that two days before its capture it was seen off Cracraig by Brora fishermen who were lying at their lines. At first they thought it a human body; as it approached *against the ebb*, they took it for a ghost! At still closer quarters they saw that it was a living beast of some kind bearing down upon them, and plied it with stones (their spare sinkers), hoping that it would turn aside and not oblige them to leave their ground; but it hardly heeded them, and so they

<sup>1</sup> Bell's British Quadrupeds, 2nd edit. p.440.

dropped their lines and sheared off. It went below near Collieburn, but was up again at Kintradwell, and still heading westward against the tide."

The skeleton is that of a perfectly adult animal, all the epiphyses

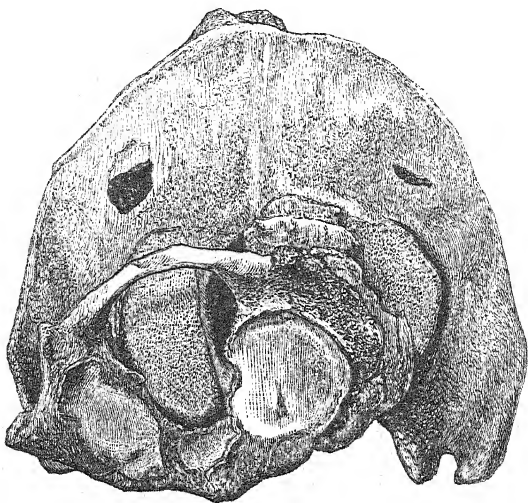


Fig. 2. Posterior surface of skull of Beluga, with dislocated atlas. One-third the size of nature.

of the vertebrae being united to the bodies. The spine of one lumbar vertebra has been recently broken off close to the base, probably the injury referred to in Dr. Joass's letter.

On examining the skull a most remarkable evidence of old injury and subsequent recovery showed itself. The atlas has been dislocated off the occipital condyles to the left side and tilted a little obliquely, so that the right transverse process is somewhat higher than the left. The dislocation has been complete, the whole of the surfaces formerly in apposition being now free from each other. The prominent inner edge of the left articular surface has passed beyond the outer edge of the condyle and lodged in the hollow which bounds it externally, and so has been prevented by the contraction of the cervical muscles from returning into its place. In this position the bones have become firmly fixed by deposit of new osseous matter around the right side of the joint, and partially covering the exposed right condyle. The aperture for the passage of the spinal cord is narrowed to a chink scarcely three quarters of an inch in greatest transverse diameter. The articular surfaces, as far as they can be seen, have preserved their normal form, and are only slightly rougher than is natural, which clearly shows that the dislocation was traumatic, and not occasioned by disease of the joint. Indeed there is no evidence of



any previous disease in this or any other part of the vertebral column. The formation of new bone, resulting in ankylosis, is what might naturally be expected to occur as the consequence of such an injury, and is the usual sequence of dislocation of the atlas, when not immediately fatal, in the human subject.

In the present case it is difficult to imagine how such an accident can have been occasioned, as in the case of an aquatic animal there is no possibility of a fall on the head, the common cause of such dislocations. Even a violent collision of the head against a rock or ship can scarcely have produced such displacement, in the case of an animal floating freely in the water, unless there were some counterpressure causing resistance on the part of the trunk. The animal certainly had received a blow on the fore part of the head, as at about three inches from the apex of the rostrum, on the right side, there is a roughened surface on which new bone has been thrown out, very probably at the same date as that at the occiput, and long antecedent to the recent wound observed at the time of its capture.

However the injury may have been brought about, the specimen affords a remarkable illustration of recuperative power, as the laceration of all the parts around the articulation, and effusion of blood from the plexus surrounding the cord, must have been considerable, and the ability to pursue and capture living prey must have been, for a time at least, greatly interfered with. The spinal cord itself being of comparatively small diameter in proportion to the size of the aperture through which it passes, seems to have escaped serious injury, and to have accommodated itself to the abnormal position of the surrounding bones. After recovery the head was fixed in a very abnormal position with regard to the body, which may account for the wandering of the animal so far from its natural habitat, and for the facility of its capture.

The following papers were read:—

## 1. Description d'un nouveau Synallaxe péruvien.

Par L. TACZANOWSKI, C.M.Z.S.

[Received July 4, 1879.]

Les deux mâles du dernier envoi de M. Stolzmann, placés dans ma dernière liste sous le nom de *S. frontalis* (P. Z. S. 1879, p. 230), sont bien différents de cette espèce, et me paraissent appartenir à une forme inédite, à la quelle je propose un nom et une diagnose comme il suit.

## SYNALLAXIS FRUTICICOLA, sp. nov.

*Fusca; pileo cinnamomeo, fronte fusca, striga postoculari flavicanti-cervina; alis extus cinnamomeis, cauda rufa; subtus cineracea; gula albida, ventre medio latissime albo, hypochondriis et crisso fusco lavatis. Longit. tota 187-190 mill. (Stolzmann), envergure 190 (Stolzmann), alæ 60, caudæ 95, rostri a commissura 19, tarsi 22, digiti medii 13.*

Cette forme est très-voisine du *Synallaxis frontalis*, Pelz., mais parfaitement distincte. La couleur du dos est plus olive que dans l'espèce citée. Le dessus de la tête présente plusieurs différences : le gris foncé occupe également le front sur l'espace un peu moins long, le roux de la partie postérieure de la tête est d'une nuance beaucoup plus claire, plus largement disposé et bordé dans sa partie postoculaire d'une large bande fauve roussâtre, bien distincte. Il y a aussi comme dans le *S. frontalis* une raie blanchâtre entre la naissance du bec et le bord supérieur de l'œil. La face dorsale de l'aile est à peu près comme dans l'espèce citée. Tout le dessous du corps est en général plus clair ; la gorge un peu plus blanche ; le milieu du ventre largement occupé de blanc ; le gris de la poitrine et des côtés du cou est beaucoup moins foncé ; les côtés du ventre également lavés d'olivâtre.

Le bec est beaucoup plus faible, à arête moins arquée à l'extrémité, d'une couleur cornée noirâtre ; les pattes moins robustes, un peu plus longues, gris-olivâtres. La queue sensiblement plus longue. Iris gris-brunâtre.

Ce Synallaxe ressemble aussi au *S. ruficapilla*, Vieill., du Brésil, mais il en diffère principalement par le couleur du front.

Deux mâles tués à Tambillo le 7 janvier 1878.

## 2. Description d'un nouveau Tyrannide péruvien.

Par L. TACZANOWSKI, C.M.Z.S.

[Received August 18, 1879.]

Plusieurs exemplaires fournis par M. Jelski de Paltaypampa et de Ropaybamba, en 1872 et 1873, et ensuite par M. Stolzmann de Tambillo paraissent appartenir à une espèce inédite, tant plus que MM. Jelski et Stolzmann ont trouvé de grandes différences dans les habitudes de cet oiseau de celles du *Myiarchus nigriceps*, avec lequel il se trouve dans les mêmes localités. Je lui propose donc le

nom sous lequel il m'a été dernièrement envoyé, et la diagnose suivante.

MYIARCHUS CEPHALOTES, Stolzm. MS.

*M. tyrannulo simillimus, sed rostro valde brevior; dorso et capite supra olivaceis; gula pallide cinerea; pectore, abdomine, subcaudalibus subalaribusque flavis; alis nigricantibus albido trans fasciatis; tertiariarum limbo lato albido; cauda nigricante, rectricibus lateralibus albido marginatis.*

Cette forme est la plus voisine du *M. tyrannulus* (Vieill.), mais elle diffère par le bec beaucoup moins long, moins large et d'une autre forme, en ce que ses lignes latérales sont presque droites, tandis que dans l'espèce brésilienne elles sont légèrement convexes dans les deux tiers de leur partie basale, ensuite concaves. En coloration elles se ressemblent beaucoup, mais la couleur du dos est dans cette forme péruvienne sensiblement plus olive, bien distincte de la nuance brunâtre foncée du dessus de la tête, tandis que le dos de l'espèce brésilienne est d'une nuance plus brunâtre, moins distincte de la couleur de la calotte, qui est un peu plus brune que celle de cette nouvelle espèce. Le cendré clair de la gorge s'étend moins sur la poitrine; cette dernière et le ventre sont d'un jaune pâle, analogue à celui du *M. tyrannulus*, les côtés cependant du ventre sont beaucoup moins colorés d'olivâtre que dans l'espèce citée. Les ailes sont noirâtres, traversées de deux larges bandes blanchâtres, formées par les bordures des tectrices, qui dans le *M. tyrannulus* sont aussi distinctes mais beaucoup plus foncées; les bordures des rémiges tertiaires sont blanches et assez larges, celles des secondaires fines, verdâtres ou rousses; la queue est à peu près comme dans le *M. tyrannulus*. Elle diffère aussi de ce dernier oiseau par l'aile sensiblement plus longue et plus aiguë.

Du *M. nigriceps* il se distingue par le bec un peu plus court, et par beaucoup de détails de la coloration, comme la nuance du sommet de la tête et du dos, le gris cendré moins étendu sur la poitrine, le jaune des parties inférieures plus pâle, les bandes alaires, les bordures des tertiaires, etc.

Le bec est noir; les pattes noirâtres; iris brun foncé.

♂. Longueur totale 218 mill., envergure 304, aile 87, queue 87, tarse 21; bec depuis la commissure 22, depuis la narine 12.

♀. Longueur totale 204 mill., envergure 304, aile 90, queue 92, tarse 21; bec depuis la commissure 22, depuis la narine 12.

M. Stolzm. dit dans sa lettre 5 avril que cet oiseau, qui habite les mêmes localités avec le *M. nigriceps*, se tient constamment, comme le *Tyrannus melancholicus* sur le sommet des arbres élevés, tandis que le *M. nigriceps* reste toujours dans les buissons épais, et seulement par hasard il s'élève plus haut. Le *M. cephalotes* se distingue au premier coup d'œil par sa tête énorme, qui dans les peaux desséchées perd en grande partie ce caractère. Le *M. cephalotes* est plus grand; les dimensions prises sur beaucoup d'exemplaires ont donné sa différence de 21 mill. sur la longueur totale et de 41 sur l'envergure, ce qui est considérable dans un oiseau d'une taille pareille.

## 3. Notice sur quelques Oiseaux du Turkestan.

Par L. TACZANOWSKI, C.M.Z.S.

[Received July 4, 1879.]

Une paire de chardonnerets que M. le capitaine Garlinski vient de fournir du Turkestan au Musée de Varsovie, diffère d'une manière aussi remarquable du chardonneret d'Europe, *Carduelis elegans*, Steph., que cet oiseau mérite d'être distingué comme une race locale.

Cet chardonneret est beaucoup plus grand, il a à peu près une taille d'un moineau, le bec est plus long et plus robuste. La coloration est en général plus claire. Le brun du dos est beaucoup moins foncé et pas aussi uniforme que dans les oiseaux européens, mais nuancé par les bordures plus pâles. Les deux grosses taches pectorales brunes sont beaucoup plus pâles et pas aussi nettement dessinées. Dans le mâle la nuance jaune accompagnant ces taches, qui est l'unique caractère superficiel distinctif parmi les deux sexes, est dans cette forme asiatique bien visible à l'extérieur, car elle s'étend beaucoup plus loin vers le bout des plumes, et se trouve même sur des plumes qui n'ont rien de brun,—tandis que dans le chardonneret commun elle est strictement réduite à la base de ces plumes, et complètement cachée par la couleur brune. La bande brune devant ces deux grosses taches pectorales, bien prononcée dans le chardonneret européen, manque complètement dans le mâle du Turkestan, et est à peine dessinée dans la femelle. Les côtés du ventre sont blancs, à peine colorés de brunâtre. Du reste ils ressemblent en tout aux oiseaux d'Europe, si ce n'est que comme l'oiseau est plus grand, plusieurs espaces blancs sont plus volumineux, comme la bande postoculaire, la tache nuchale, etc. Le noir du sommet de la tête est dans la femelle remplacé par la couleur brunâtre pâle; dans le mâle il n'y a que quelques traces de cette nuance (dans le chardonneret d'Europe je n'ai jamais vu de pareille coloration de cette partie). Je propose le nom pour cette forme de *Curduelis major* et la diagnose suivante:—

*C. eleganti simillima, sed valde major, rostro longiore et robustiore, coloribus dilutionibus.* ♂. Long. alæ 87, caudæ 58, rostri a fronte 15, altit. rostri 9 mill. ♀. Long. alæ 86, caudæ 58, rostri a fronte 14, altit. rostri 9 mill.

Dans le même envoi du capitaine Garlinski il y a encore plusieurs oiseaux d'un intérêt scientifique. Une femelle d'*Accentor alpinus* (Gm.), identique aux oiseaux d'Europe et ne présentant qu'une petite différence dans la coloration générale un peu plus pâle, et une légère teinte isabelle sur la partie postérieure du dos, du croupion, des scapulaires et du ventre. Les dimensions un peu plus petites (l'aile pliée mesure 94 mill.). Dans la liste des oiseaux du Turkestan, publiée par M. Sewertzow, dans le Journal f. Ornithologie, 1875, p. 177, cette espèce n'est pas comprise, il est donc intéressant de la retrouver dans la partie orientale du Turkestan (district Fergan),

où est probablement la limite orientale de sa distribution géographique. Dans la Sibérie orientale l'espèce est représentée par une forme voisine, *A. erythropygius*, Cab.

Parmi les *Buteo ferow* (Gm.), il y a un exemplaire tout brun comme cela arrive quelquefois dans le *B. vulgaris*, plus souvent dans la petite race orientale, *B. martini*, Hardy, et dans plusieurs autres espèces. La queue de cet individu est cendrée, barrée de 7 raies étroites brunes complètes et d'une large bande terminale presque noire; ces raies sont pâles mais distinctes sur le côté inférieur de la queue. La partie basale de la page externe des primaires est imprégnée de cendré; le côté interne de toutes les rémiges est d'un blanc grisâtre, barré de brunâtre.

Il y a deux formes de pigeons, *C. livia*, L., et *C. rupestris*, Bp. Ces derniers sont tout-à-fait comme ceux de la Daourie et du Baical méridional, mais pas comme ceux de la côte de la mer du Japon. Quant aux premiers, ils sont beaucoup plus forts que les oiseaux de Triest et de l'Algérie, avec lesquels je les ai comparés: ils ont le bec beaucoup plus fort, ainsi que les pattes et toutes les dimensions; l'aile pliée du mâle dépasse de 15 mill. celle du mâle de l'Algérie et de 20 l'aile du mâle de Triest. Dans la coloration il y a quelques petits détails différentiels; et principalement dans les oiseaux du Turkestan la nuance rouge est beaucoup plus forte et plus repandue autour de la gorge, le cendré bleuâtre du dos plus clair, et le blanc du bord de la rectrice externe beaucoup plus pur.

#### 4. On a Collection of Birds from the Comoro Islands.

By Captain G. E. SHELLEY.

[Received August 9, 1879.]

Dr. Kirk, H.B.M. Consul-General of Zanzibar, has most kindly forwarded to me a collection of birds from the Comoro Islands, consisting of 186 specimens: 83 were collected in the island of Grand Comoro, and belong to 25 species. Of these, 17 are known to inhabit the coast of Madagascar, 9 the continent of Africa, and 17 are common to the two islands of Grand Comoro and Anjuan (Johanna).

One species of *Zosterops* appears to be new; and I therefore name it *Z. kirki*, in acknowledgment of the assistance rendered to ornithology by Dr. Kirk. The remaining 103 specimens were obtained on the island of Anjuan: these belong to 23 species, three of which are new to that island—*Psittacula cana*, *Tringa subarquata*, and *Eurystomus glaucurus*.

Mr. E. Newton, in a valuable communication to this Society (P. Z. S. 1877, pp. 295–302), on a collection of birds from the Island of Anjuan made by Mr. C. E. Bewsher, appends a most useful table showing the distribution of the species then known to inhabit the islands of the Comoro group and remarks:—"From this

it will be seen that we absolutely know nothing of the avifauna of the Great Comoro."

It is most interesting, therefore, to have received a collection from Grand Comoro, and once more to couple Dr. Kirk's name with the ornithology of this group of islands, which he was one of the first to explore scientifically, an account of his former investigations having been published by Dr. Sclater (*Ibis*, 1864, p. 292).

In order to render this short communication as serviceable as possible, I have followed Mr. E. Newton's arrangement (*P. Z. S.* 1877, p. 295), and prefixed a dagger (†) to those species which are here recorded for the first time from a new locality, and a star (\*) to the species new to this group of islands.

\*1. *CIRCUS MACROSCELIS*, E. Newton.

*Circus macroscelis*, Sharpe, *P. Z. S.* 1875, p. 71.

*Circus macroscelus*, Hartl. *Vög. Madag.* p. 38 (1877).

?*Circus maillardi*, E. Newton, *P. Z. S.* 1877, p. 302.

A single specimen from Grand Comoro agrees perfectly with the description of the type of *C. macroscelis*, as given by Mr. R. B. Sharpe (*l. c.*), in the measurements of the tarsus and in the number of bands on the tail. The specimen unfortunately not having been sexed, I am unable to say for certain whether this is the female of *C. maillardi* or not; but I incline to Mr. Sharpe's opinion that it is only the hen of that bird.

†2. *ASTUR PUSILLUS* (Gurney).

*Scelopizias pusillus*, Hartl. *Vög. Madag.* p. 31.

*Accipiter pusillus*, E. Newton, *P. Z. S.* 1877, p. 296.

Two immature specimens, Grand Comoro.

Adult male and female and an immature bird, Anjuan.

♂ ad. Total length 9·7 inches, wing 5·6, tail 4·8, tarsus 1·95.

♀ ad.           "       11·5                       "       6·4,       "       5·3,       "       2·05.

†3. *MILVUS ÆGYPTIUS* (Gm.).

*Milvus ægyptius*, Sharpe, *Cat. B. i.* p. 320 (1874); Hartl. *Vög. Madag.* p. 27; E. Newton, *P. Z. S.* 1877, p. 296.

One adult specimen, Grand Comoro.

†4. *STRIX FLAMMEA*, Linn.

*Strix flammea*, Sharpe, *Cat. B. ii.* p. 291 (1875); Hartl. *Vög. Madag.* p. 52.

*Aluco flammea*, E. Newton, *P. Z. S.* 1877, p. 296.

One specimen, Grand Comoro.

†5. *CORACOPSIS COMORENSIS*, Peters.

*Coracopsis comorensis*, Hartl. *Vög. Madag.* p. 230; E. Newton, *P. Z. S.* 1877, p. 296.

Four specimens, Grand Comoro, and seven from Anjuan.

†6. *CORACOPSIS BARKLYI*, E. Newton.

*Coracopsis barklyi*, E. Newton, P. Z. S. 1867, p. 346, pl. 22, 1877, p. 296; Hartl. Vög. Madag. p. 231.

One specimen from Grand Comoro and one from Anjuan.

Compared with a specimen of *C. barklyi* from the Seychelles, I find the Comoro birds slightly darker and the greyish green on the primary coverts and quills almost absent.

Mr. E. Newton was led to the belief that this species had been introduced as a cage-bird from the Seychelles islands, owing to Mr. Bewsher having only met with a single specimen; but now that we know of three examples and from two of the islands, I think that this Parrot should be looked upon as indigenous to the Comoro group.

\*7. *PSITTACULA CANA* (Gm.).

*Psittacula cana*, Hartl. Vög. Madag. p. 234.

Seven specimens, Anjuan.

Mr. C. E. Bewsher heard of this species from the natives; but as he did not obtain a specimen, it is here recorded for the first time as a native of the Comoro Islands. Hitherto this Love-bird has only been met with in Madagascar, and by Baron von der Decken on the small island of Mafia, south of Zanzibar, where, I presume, it was only an escaped cage-bird.

\*8. *LEPTOSOMA DISCOLOR* (Herm.).

*Leptosoma discolor*, Sharpe, Ibis, 1871, p. 285; Hartl. Vög. Madag. p. 255.

a, b. Adult males, and c, d, female, Grand Comoro.

e. Immature male, Anjuan.

These agree in their colouring with Madagascar birds; but the specimens from Grand Comoro are remarkably small, as the following measurements will show, but should not in my opinion be separated as specifically distinct.

	Entire length.	Wing.	Tail.	Tarsus.
	in.	in.	in.	in.
♂ ad. Madagascar.....	18·5	10·0	8·0	1·30
♂ juv. Madagascar ....	16·0	9·7	8·0	1·20
♂ juv. Anjuan .....	16·2	9·0	7·3	1·25
a. ♂ ad. Grand Comoro ..	15·7	9·5	7·5	1·15
b. ♂ ad. Grand Comoro ..	15·0	8·9	7·3	1·10
c. ♀. Grand Comoro ....	14·6	8·8	7·3	1·15
d. ♀. Grand Comoro ....	15·0	8·5	6·8	1·15

\*9. *EURYSTOMUS GLAUCURUS* (P. L. S. Müll.).

*Eurystomus glaucurus*, Sharpe, Ibis, 1871, p. 271.

*Eurystomus madagascariensis*, Hartl. Vög. Madag. p. 67.

One adult specimen from Anjuan. It agrees perfectly with the Madagascar bird.

10. *CORYTHORNIS CRISTATA* (Linn.).

*Corythornis vintsioides*, Sharpe, Monogr. Alced. p. 33 (1867);  
E. Newton, P. Z. S. 1877, p. 297.

*Corythornis cristata*, Sharpe, Monogr. Alced. p. vi (1871);  
Hartl. Vög. Madag. p. 78.

Seven specimens, Anjuan.

†11. *MEROPS SUPERCILIOSUS*, Linn.

*Merops superciliosus*, Hartl. Vög. Madag. p. 81; E. Newton,  
P. Z. S. 1877, p. 297.

Two specimens from Grand Comoro, and five from Anjuan.

I feel no doubt as to the forms inhabiting the Comoro Islands, Madagascar, and East and South Africa being identical. They are the true *M. superciliosus*, Linn., and are distinct from the Egyptian and more northern form *M. ægyptius*, Forsk.

\*12. *CINNYRIS NOTATA* (P. L. S. Müll.).

*Cinnyris notatus*, Shelley, Monogr. Sun-birds, pt. ii. (1876).

*Nectarinia angladiana*, Hartl. Vög. Madag. p. 89.

Five adult males, Grand Comoro.

This species, hitherto only known from Madagascar, appears to be not uncommon in Grand Comoro. Compared with the Madagascar bird I can find no specific difference, though in the specimens before me there is a slight but variable tendency to a blue gloss on the throat and mantle.

13. *CINNYRIS COMORENSIS*, Peters.

*Cinnyris comorensis*, Shelley, Monogr. Sun-birds, pt. ix. (1879).

Three specimens, Anjuan.

†14. *ZOSTEROPS ANJUANENSIS*, E. Newton.

*Zosterops anjuanensis*, E. Newton, P. Z. S. 1877, p. 297, pl. 33.  
fig. 1.

One specimen from Grand Comoro, and six from Anjuan.

\*15. *ZOSTEROPS KIRKI*, n. sp.

*a, b.* Two specimens, Grand Comoro.

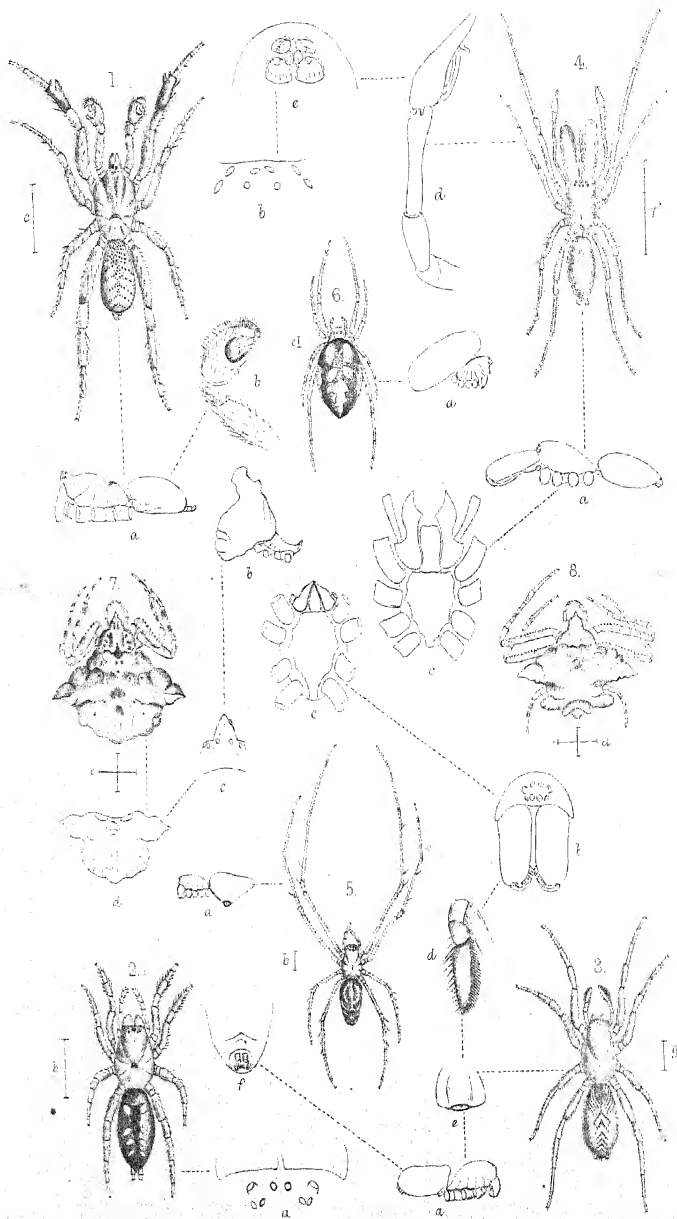
*Similis* Z. mayottensi sed multo minor et subtus omnino flava,  
*hypochondriis quoque flavis distinguenda.*

*a.* Upper parts, as well as the wing-coverts, olive-yellow, with a rather yellower shade on the upper tail-coverts; sides of the forehead and an eyebrow gamboge-yellow; remainder of the wings dark brown, the feathers margined on the outer webs with olive-yellow and on their inner webs with white; tail dark brown, with the outer webs of the feathers edged with olive-yellow; entire underparts uniform gamboge-yellow. Total length 3·7 inches, culmen 0·35, wing 2·1, tail 1·5, tarsus 0·65.

I believe the specimen I have here described to be a male, because it is slightly the brighter bird. In *b* the sides of the crop and the flanks are faintly tinted with olive.





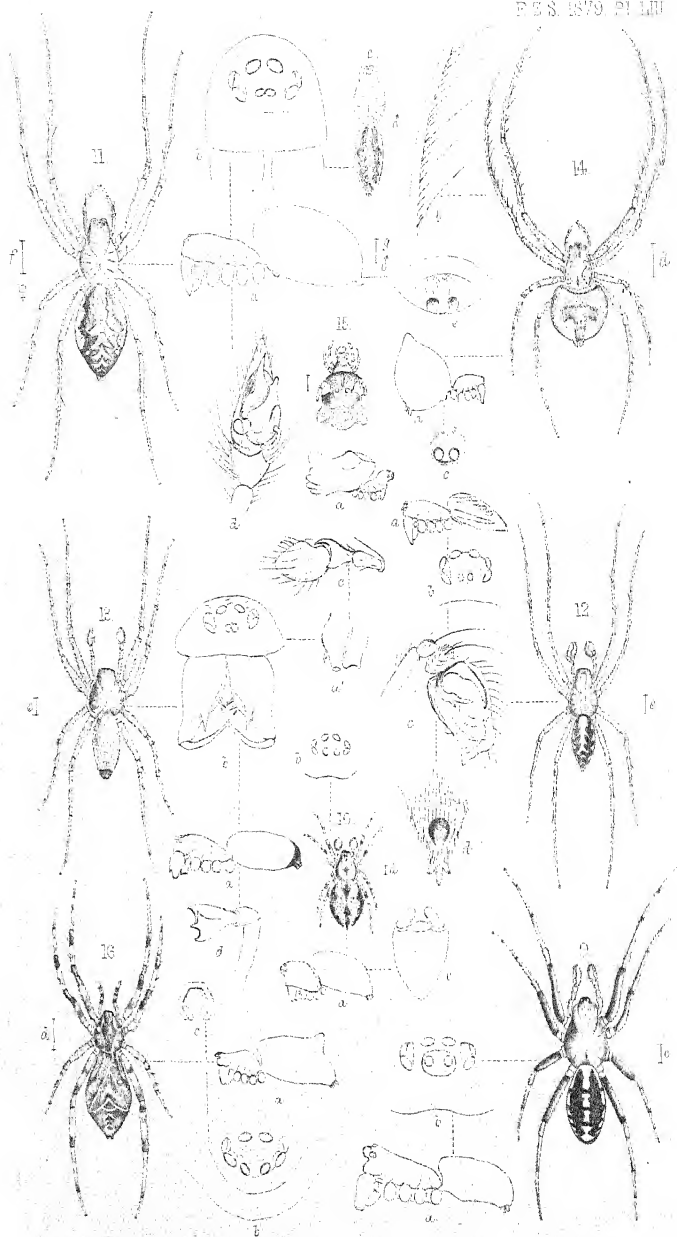


W.P. Cambridge del.  
E. Carter lith.

Mintern Bros. imp.

New Zealand Spiders.





O. F. Cambridge del.  
E. Carter lith.

New Zealand Spiders.

Western Press cop.

6. Note on the Female of *Lophophorus sclateri*, Jerdon, from Eastern Assam. By Lt.-Colonel H. H. GODWIN-AUSTEN, F.Z.S. &c.

[Received September 12, 1879.]

(Plate LI.)

As I believe the female of *Lophophorus sclateri* has never yet been described, I have much pleasure in exhibiting a specimen received lately from Sadya, Eastern Assam, and very kindly sent to me by Capt. C. R. Macgregor, who has thus again aided us to complete our knowledge of another fine species of Pheasant, which Dr. Jerdon was the first to identify as new in 1869. In the Proceedings of the Asiatic Society of Bengal, 1870, p. 61, the description of *Lophophorus sclateri* appeared; and the discovery was referred to by Mr. Sclater in the 'Proceedings' of this Society for March of the same year, where a figure of the male by Mr. Keulemans is given (P. Z. S. 1870, p. 162, pl. xiv.).

It will at once be seen how very distinct the female of this species is from that of the Monal of the N.W. Himalayas, *L. impeyanus*, in the pale-coloured rump, white termination of the tail-feathers, and the very different style of coloration of the breast, and it appears somewhat smaller in size.

*Descr.* Head and back very rich dark umber-brown, each feather of the former with a V-shaped pale ochre mark; each of the latter has a centre line of a richer brown finely mottled towards the margins. A broad extent of the rump and upper tail-coverts are pale ochraceous white, very finely, delicately mottled with dark brown. Tail above rich black, with six or seven narrow whitish bars, and tipped with the same (the countercolouring of male). Shoulder of wing very rich dark chestnut-brown, the shafts pale ochraceous. Primaries rich dark umber; secondaries slightly mottled with brown. Cheeks and throat dark umber, markings like those on the head; chin white; breast, abdomen, and thighs dull umber, most delicately and finely mottled with pale ochre. Underside of tail black, with narrow white bars. The legs appear to have been of a pale grey and the bill whitish.

Wing 11.5 inches, tail about 8, tarsus 3, bill at front 1.75.

7. On some new and rare Spiders from New Zealand, with Characters of four new Genera. By the Rev. O. P. CAMBRIDGE, M.A., C.M.Z.S., Hon. Memb. New-Zealand Institute.

[Received September 24, 1879.]

(Plates LII. & LIII.)

The Spiders described in the following pages are a portion of various small collections sent to me at different times during the last

few years from New Zealand by Captain F. W. Hutton, and of another collection brought to me from the same region of the world, in 1878, by Mr. A. S. Atkinson. Those selected for present record are, I believe, all new to science, excepting two species—*Robsonia marina* (Hector), remarkable for its submarine habits, and *Walckenaëra cristata*, Bl. The occurrence of this latter Spider is very interesting, as being the first species of an extensive European, North-American, and North-Asiatic group as yet found in any part of Australasia. Another Spider now recorded (*Episinus antipodius*, sp. n., p. 701) appears to me to indicate the true systematic position of the genus to which it belongs. The genus *Episinus*, Walck., represented at present by five or six species only (and those mostly European), has hitherto been included in the family Theridiidae; it has always, however, seemed to me to have little real affinity with the typical Spiders of that group, but to be more nearly allied to the Thomisidae, as connected with them through the peculiarly Australasian genus *Stephanopsis*, Cambr. An undoubted species of *Episinus* having now occurred in New Zealand (where *Stephanopsis* is also found), I have ventured to place the former near to the latter, though (owing to a difference in the number of the tarsal claws, and for other reasons) in a distinct family, *Episinidae*.

#### Fam. THERAPHOSIDES.

##### Genus ARBANITIS, L. Koch.

##### ARBANITIS HUTTONII, sp. n. (Plate LII. fig. 1.)

Adult male, length rather less than  $4\frac{1}{2}$  lines.

This Spider is nearly allied to *Nemesia gilliesii*, Cambr. (Trans. N. Zeal. Instit. x. p. 281, pl. x.), resembling it in general appearance, colours, and markings. It may, however, be easily distinguished by its much smaller size. The cephalothorax is darker-coloured. The legs of the first pair are darker, being of a reddish yellow-brown hue, the tibiae distinctly darker than the rest; the metatarsi also of the first pair are straight, instead of sinuously curved, and shorter than in *N. gilliesii*. When looked at in profile the occiput is more gibbous, as also is the posterior margin of the thoracic indentation. The radial joint of the palpus is very large and of a similarly tumid form, but the external edges of the large chasm (or cleft) on the outer side are not nearly so thickly studded with short spines or denticulations; in fact the denticulae on the upper edge form only an imperfect single row, whereas those on the corresponding part in *N. gilliesii* are smaller, but much more numerous; on the lower edge they are short, strong, and conical, forming two irregular rows only, and numbering only 18 to 20, whereas in *N. gilliesii* they are smaller, but densely grouped, and quite past counting. The digital joint has on the upperside numerous, rather obtuse, straight, not very long spines, but all of equal length, with a few on the fore part of the upperside of the radial joint; whereas on the radial joint of *N. gilliesii* there are no spines, and but very few, mingled with numerous hairs and some bristles, on the digital joint. The

palpal organs consist of a bulbous base, produced into an irregular, tapering, somewhat twisted stem, ending in a rather obtuse point, while in *N. gilliesii* the stem is much longer, curved, and drawn out into a much finer point.

A single example of this very interesting and distinct species was received in 1879, from Capt. Hutton, by whom it was found at Dunedin, New Zealand. Although the male cannot be mistaken for that of *N. gilliesii*, if the above differences be carefully noted, it is probable that considerable difficulty may be experienced in distinguishing the females, excepting by the size, if, indeed, this character should prove a constant one. It is more than probable, however, that the trap-door nest, which will certainly be found to belong to it, will prove distinct in some portion or detail of its structure. It is with great pleasure that I confer the name of Capt. Hutton upon this Spider, being indebted to him for a large amount of materials for a Monograph on New-Zealand Spiders, and of which materials I hope to make full use before the expiration of any great length of time.

#### Genus MIGAS, L. Koch.

MIGAS DISTINCTUS, sp. n. (Plate LII. fig. 2.)

Length of an immature female  $4\frac{1}{2}$  lines.

*Cephalothorax* short, oblong-oval, a little longer than broad; anterior extremity broad and truncated, lateral marginal constrictions at the caput very slight; profile of caput rounded, and running off in a straight line from the thoracic fovea or indentation to the hinder extremity of the thorax; the fovea curved, but not very long, the convexity of the curve being directed forwards. The other indentations are strong; on the upper part of the caput and on the ocular area and clypeus are a few strong bristly hairs of different lengths. The height of the clypeus is about equal to the length of the line formed by the fore-central pair of eyes. The eyes form a rather narrow area, whose transverse diameter is more than three times the length of the longitudinal diameter. All are small, the fore-laterals distinctly the largest, and each is separated from the fore-central on its side by an interval a little exceeding its diameter; the fore-centrals are separated from each other by a diameter's interval, and are placed on a largish oval, black, slightly tuberculate spot. Each hind-lateral eye is separated from the fore-lateral on its side by an interval exceeding the diameter of the former; and each hind-central eye is flattened, of a shining pearly lustre, subtriangular, and contiguous to the lateral eye next to it. Taken in two transverse lines, the eyes form two curved rows, of which the anterior has its curve directed backwards and the posterior forwards.

The *legs* are short, strong, paler than the cephalothorax, furnished with hairs, bristles, and spines; the most noteworthy of the latter form a double row beneath each side of the tibiae and metatarsi of the first and second pairs; the superior terminal claws

are long, strong, and hooked, with two or three denticulations underneath; the inferior claw has no denticulation, nor is there any scopula beneath the tarsi.

The *falces* are powerful, nearly vertical, but rather prominent in front; the fore extremities have no spines; the fang is short, but very powerful.

The *maxillæ* are very divergent but straight, with parallel sides, and a short subconical point at the extremity on the inner side. The *labium* is short-oblong, rounded at its apex, and (with the *maxillæ*) studded with very short, strong, tooth-like spines; these parts (with the basal joints of the legs) are of a pale dull yellowish hue.

The *abdomen* is oval, hairy, and projects well over the base of the cephalothorax; it is of a dark, somewhat warm maroon-brown colour, minutely speckled with pale spots, and with several pairs of distinct clongate-oval, oblique spots along the upperside, forming two longitudinal rows, which converge as they run backwards; between these rows the surface is darker than the rest. The spinners (four in number) are dull yellowish, those of the superior pair pointed; the last two joints very short; inferior spinners much the smallest. The sides and underpart of the abdomen are paler than the upperside.

A single example of this Spider was received from Dunedin, New Zealand, where it was found by Captain F. W. Hutton. It may be distinguished readily from *Migas paradoxus*, L. Koch, by its much smaller and more widely separated eyes, and by the very different colour and pattern of the abdomen.

#### FAM. ENYOIDES.

##### HUTTONIA, gen. nov.

*Cephalothorax* much longer than broad, roundly truncated at the fore extremity; profile strongly arched, the highest part being at the occiput; normal grooves and indentations, as well as the constrictions on the lateral margins of the caput, very slight.

*Eyes* subequal, rather closely grouped, in two very nearly concentric curved rows, whose convexity is directed backwards, and of which the anterior row is a little the shortest and least curved; the fore-centrals are the largest of the eight, and are seated on a slight tubercular prominence.

*Legs* not very long, moderately strong, 4, 1, 2, 3. The femora of the first and second pairs stronger than the rest, and particularly so at the posterior extremity on the upperside. Femoral joints rather unusually long, and of a clavate form. Clothed with hairs and bristles only. Tarsal claws three; those of the third and fourth pairs placed on a small supernumerary articulation or claw-joint. Scopula slight, and only beneath the tarsi and metatarsi of the first and second pairs. Palpi (of the female) without any terminal claw.

*Maxille* tolerably long, somewhat tapering, and blunt, pointed at their extremities, gibbous at the base, slightly impressed beyond the middle, and greatly inclined to each other, their points meeting over



the *labium*, which is long, of a diamond shape, sharp-pointed at the apex and truncated at the base, the apex fitting up close beneath the extremities of the *maxillæ*; *sternum* oval.

*Abdomen* of a somewhat cylindric-oval form. Close in front of the spinners, on the underside, is a short transverse dark fold in the epidermis, which has every appearance of being the external aperture of a special breathing-apparatus; not far in front of this is a much more extensive fold, which, if I mistake not, contains one or two other such apertures; but, in the absence of other examples, I can only speak hesitatingly on this point. Spinners six, short, the superior pair strongest, the inferior pair two-jointed, the terminal joint very short.

*HUTTONIA PALPIMANOIDES*, sp. n. (Plate LII. fig. 3.)

The length of the adult female is rather over 2 lines.

The cephalothorax and *falces* are of a bright brownish-red colour.

The legs dull orange-yellow, tinged with red-brown.

The upper part of the caput is furnished with numerous strong hairs, and the height of the clypeus is equal to the diameter of one of the fore-central eyes.

The *eyes* of the posterior row are separated by equal intervals of about the diameter of one of the centrals of that row; the interval between those of the fore-central pair is rather less than a diameter, and each is separated from the fore-lateral eye on its side by a very slight interval. The transverse diameter of the ocular area is about double the length of the longitudinal one.

The superior tarsal claws have a very few denticulations, those on the fourth pair of legs are but three in number. I was unable to see the rest accurately.

The *palpi* are like the legs in colour; the digital joints are long, densely clothed on the outer side with numerous black bristly hairs of uniform length, and on the inner side with some longer coarse bristles, some of which are of a spiny nature.

The *falces* are strong, straight, prominent in front, the profile strongly arched; towards their fore extremity on the inner side is a small group of longish but not very strong teeth, between which and the insertion of the fang are numerous smaller and shorter denticulations. The fang is small and curves closely over the obtuse extremity of the *falk*.

The *maxillæ*, *labium*, and *sternum* are similar in colour to the cephalothorax.

The *abdomen* is of a yellow-brown hue, clothed with darker hairs. There are faint traces of a short, oblong marking (pointed behind) at the middle of the fore extremity of the upperside, followed to the spinners by a series of several, similarly indistinct, transverse angular lines.

The genital aperture is of a simple, elongated, pointed, transverse-oval form, placed at the posterior extremity of a rather considerable enlargement or prominence.

A single example, found at Dunedin, New Zealand, was received

in 1879 from Captain Hutton. In general appearance and colours it reminds one strongly of Spiders of the family Palpimanides, from which, however, it is clearly distinct, and its true position is, as it appears to me, among the Enyoides, near the genus *Ceto*, Sim., to which it seems to be tolerably nearly allied, though differing in the relative length and breadth of the cephalothorax, as well as in the form of the maxillæ and labium, and in other structural points.

Fam. AGELENIDES.

ROBSONIA, gen. nov.

*Cephalothorax* short, broad, truncated before, not very convex above; the fore extremity of the caput scarcely narrower than the thorax; lateral marginal constrictions at the caput very slight.

*Eyes* small, subequal, in two transverse subparallel rows, the anterior of which is the shortest and very close to the fore margin of the caput, rendering the clypeus almost obsolete. The posterior row of eyes is slightly curved, the convexity of the curve directed forwards; the four central eyes are the smallest.

*Legs* moderate in length, slender, 1, 4, 2, 3, furnished with very fine prominent hairs, some of which, on the undersides, are very long. On the tarsi and metatarsi of the third and fourth pairs are a very few short spines. Tarsal claws three in number; the superior pair strong, slightly curved, and furnished with about ten fine denticulations or pectinations; the inferior claw very abruptly bent downwards close to its base. The hairs are strongest and most numerous beneath the fore extremities of the metatarsi and tarsi of the second, third, and fourth pairs, but do not constitute either a scopula or claw-tuft properly so-called.

*Falces* very long, strong, straight, prominent, and almost cylindrical; the fang, when at rest, directed backwards, slightly obliquely, but approaching nearly to the position characteristic of the Theraphosides. Each falx is furnished with a row of teeth almost throughout its whole length on the inner side of the fang as it lies at rest, and two others form a short row on the opposite side of the base of the fang.

*Maxillæ* long, straight, greatly enlarged at the hinder part where the palpi are inserted, and constricted immediately above that point; their outline is rounded to the extremity, where they are obliquely truncated in a slightly hollow line inwards.

*Labium* long, about two thirds the length of the maxillæ, of a broadish oblong-oval form, truncated both at the base and apex.

*Sternum* heart-shaped.

*Abdomen* oviform: spinners six, rather short, but all of equal length, the two middle ones being of unusual size, almost equal, in fact, to the rest.

The affinities of this genus are rather puzzling. Were it not for the three terminal tarsal claws, it would seem to come easily into the family Drassides. The form of the maxillæ and labium point to a relationship with the Dysderides. It must, however, I think, be

included in the family Agelenides, where it would appear to come somewhere before the genus *Argyroneta*. It is allied to *Desis*, Walck.; but the eyes differ both in relative size and position, the legs are more slender, and the maxillæ are not divergent. These differences seem to me to separate it decidedly from that genus.

Dr. L. Koch (Die Arachn. Austr. pp. 345-351, pl. xxix. figs. 1, 2) describes two Australian Spiders which he places in the genus *Desis*, Walck. One of these (*Desis mertensii*) appears to be aquatic in its habits, very much like the Spider here described, and to which it bears considerable general resemblance. I have mentioned above some reasons for considering that the present Spider is not a *Desis*; and for similar reasons I do not think it belongs to the same genus as the Spiders described by Dr. Koch—more especially as in Dr. Koch's two species there are spines on the femora, tibiæ, metatarsi, and tarsi of the third and fourth pairs of legs, as well as on the femora of the first and second pairs, whereas in the present Spider there are a very few short spines on the metatarsi and tarsi only of the third and fourth pairs.

ROBSONIA MARINA. (Plate LII. fig. 4.)

*Argyroneta marina*, Hector, Trans. & Proc. N. Zeal. Instit. x. p. 300 (1877), and C. H. Robson, l. c. p. 299.

*Robsonia submarina*, Cambr. MS. 1877.

Adult male, length, exclusive of the falces, from 4 to 4½ lines; adult female, rather over 6 lines.

The cephalothorax and falces are of a dark reddish yellow-brown colour; the normal grooves and indentations very slightly defined. The maxillæ, labium, and sternum are of a rather lighter hue than the falces. The legs are pale dull brownish-yellow, the two basal joints nearly as dark as the sternum.

The palpi are rather long, slender, furnished with hairs only, and similar in colour to the legs; those of the male bear a very strong general resemblance to those of *Drassus lapidicolens*, Walck. The humeral joint is curved, the cubital and radial joints together equalling it in length; the radial is more than double the length of the cubital joint, and has at its fore extremity on the outer side a broadish, but not very long, bifid apophysis, whose lower limb is broad, obtuse, and much larger than the upper; the latter, as well as the superior margin of the former, are of a deep blackish colour. The digital joint is long, narrow, and tapers to a blunt point at its anterior extremity, where there are several short spines. The palpal organs are simple in structure, and not very prominent.

The abdomen is of a pale dull yellowish-brown colour, tinged (when alive) with greenish, and pretty well clothed with fine hairs of a darker hue.

The falces are porrected almost straight forwards, and are equal in length to that of the cephalothorax.

The female resembles the male in colours and general structure, but is larger, and the falces are slightly shorter. The legs also are shorter, particularly those of the first pair.

Examples of both sexes of this exceedingly interesting Spider were kindly sent to me in 1877 by Capt. F. W. Hutton, having been captured by Mr. C. H. Robson in tidal pools at Cape Campbell, in New Zealand. On a careful examination, it appeared to me that a new genus must be established to receive it. I therefore prepared a description of it under the name *Robsonia submarina*, dedicating the genus to its finder, and conferring its specific name on account of its submarine habits. Subsequently I find that Mr. Robson has published (*l. c. cit. supra*) an account of this Spider; and Dr. Hector (the Editor of 'Tr. N. Z. Inst.') has, in a footnote to Mr. Robson's paper, proposed for it the specific name *marina*, including it in the genus *Argyroneta*.

The habits of this Spider are so abnormal, that I cannot refrain from giving almost *verbatim* the following extracts from Mr. Robson's very graphic account:—

"This Spider is found in the tidal pools at Cape Campbell, and is quite at home under water, forming its nest in an old *Lithodomus*-hole, of which the rocks are full. All the Spiders of this kind which we have found have had nests in these holes, and always under water at all times of the tide. Over the mouth of the hole the Spider spins a close web, which, when finished, looks like a thin film of isinglass, and is water-proof; behind this film is the nest and egg-sac, which last is of various shapes and contains a large number of eggs. When the Spider is disturbed, it goes to the bottom of the pool; and if a small stick or straw is extended to it, it at once gets ready for a fight, advancing its long and powerful falces for that purpose. When a small fish is placed in a bottle of water with one of these Spiders, the latter will attack it at once, driving its long sharp fangs into the fish near the head, and killing it instantly."

Excepting in its aquatic habits, concerning which, however, more detail is very desirable, there is but very slight affinity between this Spider and *Argyroneta aquatica*. It is the first instance, however, on record of a Spider inhabiting the sea<sup>1</sup>.

#### Fam. THERIDIIDES.

#### Genus ARGYRODES, Linn.

#### ARGYRODES LEPIDA, sp. n. (Plate LII. fig. 5.)

Length of the adult female  $1\frac{1}{2}$  line.

*Cephalothorax* oval, truncated in front; lateral marginal constrictions at caput very slight; the profile line forms a regular and continuous curve, only interrupted by a slight notch immediately behind the eyes. The ocular area is a little prominent at its fore part, and the height of the clypeus is nearly about equal to half that of the

<sup>1</sup> Since the above description was written, I have received Dr. Llewellyn Powell's paper on this Spider, which is there described under the name of *Desis robsoni* (Trans. & Proc. N.-Zeal. Instit. vol. xi. p. 263, pl. xii., 1879). Dr. Powell considers that it is a *Desis*, and identical in *genus* with the Spiders described (*Die Arachn. Austr. l. c.*) by Dr. L. Koch. I still doubt this, for the reasons given above. There appears, however, to be no reason to supersede the specific name given to this Spider by Dr. Hector (*l. c. supra*).

facial space. The colour of the cephalothorax is a deep reddish brown; the surface is finely rugulose, and furnished with a few coarse hairs.

The *eyes* are placed in two transverse and about equally curved rows, forming a long narrow oval figure, occupying the whole width of the fore part of the caput; those of the fore-central pair are the largest, and are seated on a tubercular prominence, being also very nearly contiguous to each other; those of each lateral pair (which are rather widely removed from the four central eyes) are seated on a strongish tubercle; those of the hind-central pair form a line rather longer than the fore-centrals, and are separated from each other by a little more than a diameter's interval, an interval of about  $1\frac{1}{2}$  diameter also separating each from the hind-lateral eye on its side.

The *legs* are very slender; their relative length 1, 2, 4, 3; those of the first pair very long, of the second pair rather shorter; those of the third and fourth pairs very much shorter. They are furnished with fine hairs, and each has three slender spine-like bristles. Those of the two first pairs are of a reddish yellow-brown colour, the two hinder pairs being pale dull yellowish, broadly annulated with dark brown.

The *palpi* are slender, of a pale whitish-yellow hue, excepting the fore part of the radial and the digital joint, which are reddish brown.

The *falces* are strong, rather lighter-coloured than the cephalothorax, a little divergent at their extremities, prominent at their base in front, and furnished with very fine tubercles or granulations on their outer sides.

The *maxillæ* are of normal form, and of a dark-brown colour; the *labium* is rather darker; and the *sternum* is similar in colour to the falces.

The *abdomen*, looked at from above, is of an oval form, broadest in front, and obtuse behind: in profile it is triangular. On the upperside it is black, with a central longitudinal yellowish-white stripe; terminating short of the extremity in a triangular form, on each side of this, but shorter than it, is a narrower longitudinal curved stripe of the same hue; and following each curved stripe are two other short oblique stripes of the same colour and in the same longitudinal line. The sides are reddish, marked obscurely with several oblique pale stripes; the underside between the spinners and the extreme point of the abdomen is black, with a short longitudinal pale stripe just beneath the point. Spinners short, of a pale whitish-brown hue, and deeply imbedded in a circular kind of cavity at the lower angle of the abdomen. The genital aperture has a small slender, cylindrical, pale prominent process connected with it.

A single example of this pretty species was contained in Mr. Atkinson's New-Zealand collection.

## Genus LITHYPHANTES, Thor.

LITHYPHANTES LEPIDUS, sp. n. (Plate LIII. fig. 9.)

Length of the adult male rather less than  $1\frac{1}{2}$  line.

The *cephalothorax* is of a broadish-oval form, moderately convex above, and the profile line ascends gradually from the hinder extremity in a very nearly even straight line to the ocular area; the fore part of this area, containing the fore-central pair of eyes, is very prominent, causing a deep indentation in the profile of the clypeus, whose height, otherwise, exceeds half that of the facial space. The lateral marginal constrictions are slight, as are also the normal indentations. The colour of the cephalothorax is deep blackish brown.

The *eyes* are of moderate size; those of the hind-central pair are nearer together than each is to the hind-lateral eye on its side, being separated by less than a diameter's interval; those of the fore-central pair are smallest of the eight, and are seated in front of a largish somewhat roundish protuberance; they are wider apart than the hind-centrals, though forming a line scarcely as long. The fore- and hind-central eyes form a trapezoid whose length is greater than its breadth; those of each lateral pair are placed slightly obliquely on a strong tubercle.

The *legs* are not very long, moderately strong (1, 4, 2, 3). They are of a dull yellowish-brown colour tinged with olive. The femora are much darker than the other joints, being of a dark blackish-brown hue; the fore extremities also of the tibiae and metatarsi are tinged with the same colour. The armature consists of hairs only.

The *palpi* are short, and of a dark brownish colour; the radial is stronger than the cubital joint, and enlarges to its extremity, where it joins in closely with the digital joint: the digital joint is of tolerable size and of an oval form; the palpal organs are rather complex, though compact; and, though showing several prominent points and processes, there is not one of any remarkable character.

The *falces* are long, strong, prominent at their base in front, and project a little forwards. The fang is long, strong, somewhat sinuous; and instead of lying (when at rest) along the inner edge of the falces, appears to stretch and remain across it at right angles towards the extremity of the opposite falx. Their colour is paler than that of the cephalothorax.

The *maxillae* are strong, slightly curved, inclined to the labium, their colour being like that of the falces.

The *labium* is short, semicircular, and with the *sternum* (which is oval, somewhat truncated before) similar in colour to the cephalothorax.

The *abdomen* is oviform, not very convex above, and projects but slightly over the base of the cephalothorax. The upper part and sides are black, with three longitudinal white bands broken into more or less distinct separate patches; the central band is the strongest, the others forming a margin on each side of the upper part of the abdomen: all these bands unite at the fore extremity. The underpart is of a browner tinge, and has an indistinct marginal

whitish broken line on each side, with a central spot of the same hue. The surface of the abdomen is thinly clothed with short stout fine hairs.

An example of this small, but very distinct, Spider was contained among others sent to me from New Zealand by Capt. F. W. Hutton.

#### ATKINSONIA, gen. nov.

*Cephalothorax* short, considerably convex above; caput large, level on upperside. Ocular area slopes rather downwards and forwards, and is prominent; hinder slope steep; clypeus rather high and compressed.

*Eyes* as in *Euryopsis*, Menge; four form a square in the middle, and on each side is a pair placed rather obliquely.

*Legs* short, slender; 4, 1, 2, 3; furnished with longish coarse hairs and slender bristles only.

*Falces* very small. *Maxillæ* small, strongly inclined to the *labium*, which is very short, rather wide, and with a curved apex. *Sternum* distinctly heart-shaped.

*Abdomen* flattened oviform, projecting well over the base of the cephalothorax; cuticle somewhat coriaceous, thickly covered with small pock-like markings, and clothed thinly with longish coarse hairs.

Allied to *Euryopsis*, but the form of the cephalothorax is quite different.

#### ATKINSONIA NANA, sp. n. (Plate LIII. fig. 10.)

Adult male, length  $\frac{1}{16}$  of an inch.

The *cephalothorax* is of a brownish-red hue, with a small dark blackish patch at the occiput continued forwards by a line of the same colour.

The *eyes* of each row respectively are equidistant from each other.

The *legs* are of the same colour as the cephalothorax; the anterior extremities of the femora and the undersides of the tibiae somewhat suffused with dark brown.

The *palpi* are short; the radial is stronger than the cubital joint; the digital joint is large, oval, and has a small sharp-pointed black-tipped projection at the fore extremity. The convex sides of these joints are not (as in *Euryopsis* and some other genera) turned inwards towards each other. The palpal organs are simple, with a rather prominent, sharp-pointed process at their extremity.

The *maxillæ*, *labium*, and *sternum* are similar in colour to the legs, and the latter is covered with small pock-like markings.

The *abdomen* is of a rather lighter hue than the cephalothorax, thickly studded both above and below with minute dark red-brown pock-like markings, and thinly clothed with longish coarse hairs; the upperside has three longitudinal black, and rather irregular, bands, a central and two marginal ones; these leave a large, somewhat leaf-shaped reddish marking, bisected longitudinally by the central black band, and dentated on its margins. The spinners are short, compact, and enclosed within a kind of sheath-like circular border.

The female differs from the male in having the black abdominal bands broader and more distinctly marked, and the leaf-shaped reddish marking, consequently, narrower and more distinct; the black patch at the occiput is also larger.

Received from Mr. Atkinson, by whom they were kindly brought to me, with other Spiders, from New Zealand.

PHYCOSOMA, gen. nov.

Allied to *Atkinsonia*, but differs in the still shorter and almost round cephalothorax, the much narrower and oviform sternum, the longer legs (4, 1, 2, 3), and the form of the abdomen, which last projects over the cephalothorax so as to conceal the greater portion of it. The cuticle of the abdomen is not coriaceous, nor covered with pock-marks.

The eyes and ocular area are very nearly like those of *Atkinsonia*.

The whole Spider bears considerable resemblance to the genus *Phycus*, Cambr.

PHYCOSOMA ŒCOBIOIDES, sp. n. (Plate LII. fig. 6.)

Adult female, length  $\frac{1}{8}$  of an inch.

The ocular area is large and prominent, with a strongly impressed clypeus; the fore side of the square formed by the four central eyes is longer than the posterior side, and the interval between the hind-central pair of eyes is slightly less than that between each and the hind-lateral eye next to it. The colour of the cephalothorax is dull brownish yellow, with a distinct black marginal line; the upper part of the caput, excepting a patch surrounding the hind-central eyes, is brown-black.

The legs are of tolerable length, yellow-brown tinged with reddish, and are furnished with hairs and slender bristles only.

The palpi are similar in colour and armature to the legs.

The maxillæ and labium were almost concealed by the folding over them of the anterior legs, which could not be removed without serious damage to the specimen; but they appeared to be very similar in form and size to those of *Atkinsonia nana*.

Falces very small, and similar in colour to the cephalothorax, suffused with blackish at the extremities.

Sternum dull brownish yellow, with a broadish dusky black margin.

Abdomen large, oval, and greatly projecting over the cephalothorax; it is of a blackish-brown hue; on the upperside is a large, rather obscure, yellow-brown, tapering, somewhat dagger-shaped, interrupted, longitudinal central marking, mostly covered with white cretaceous spots and patches; the sides also have each a longitudinal yellow-brown marking, similarly covered with white. The central marking on the upperside appears to consist of the ordinary angular bars exaggerated, especially the anterior one, which is preceded by two large, nearly parallel longitudinal patches of the same colour. Spinners exceedingly short.

This minute Spider, which has a great general resemblance to some species of *Œcobius*, was received from Mr. Atkinson, by whom it was found in New Zealand.



## Genus WALCKENAËRA, Bl.

## WALCKENAËRA CRISTATA, Bl.

Examples of both sexes of this Spider were contained among others kindly brought to me from New Zealand by Mr. A. S. Atkinson, in 1878. I have carefully compared them with types of the species found both in England and in various parts of the continent of Europe, and (excepting in being a little larger) can find no structural difference whatever.

The occurrence of this species in New Zealand, where it can have had but slight chance of being introduced from Europe, is very interesting, especially as it is the first Spider of this large group as yet recorded from the Antipodes. I should now confidently expect that many more species of *Walckenaëra* will be found in New Zealand, when its Microaraneæ come to receive due attention.

## Genus LINYPHIA.

## LINYPHIA SUBDOLA, sp. n. (Plate LIII. fig. 11.)

Length of an adult female  $2\frac{1}{2}$  lines, and of an adult male  $1\frac{3}{4}$  line.

The *cephalothorax* of the female is of a dark yellow-brown colour; the lateral marginal constrictions at the caput are moderate, the other normal indentations well marked. The profile forms a slight, but tolerably even curve to the eyes, though slightly fuller near the occiput; the height of the clypeus exceeds half that of the facial space, and its direction is nearly vertical.

The *eyes* are rather closely grouped in the usual four pairs; those of the lateral and hind-central pairs are of fair size, very nearly equal, and seated on black tubercular spots; the interval between those of the hind-central pair is equal to nearly about half of an eye's diameter, and each is separated by a diameter's distance from the hind-lateral eye on its side, and by a slightly greater interval from the fore-central eye next to it. The fore-centrals are very small, indistinct, and contiguous to each other.

The *legs* are rather slender, moderately long, of a yellowish or brownish-yellow hue, furnished with fine hairs and a very few slender bristle-like spines. Their relative length appears to be 1, 4, 2, 3.

The *palpi* of the female are slender, and similar in colour to the legs; in those of the male, the cubital and radial joints are very short; the latter is longest and much the strongest, being enlarged gradually from the posterior to the anterior extremity, and furnished on the sides with numerous strong bristly hairs. The digital joint is long, and tapers regularly to a point. The palpal organs are tolerably complex; at their base on the outer side is a small, curved, obtusely-ended, corneous process; and on the inner side, opposite to it, is a curved spine, whose attenuated point has a circular form.

The *falces* are tolerably long, rather strong, a little prominent at their base in front, divergent at the extremities, and slightly directed backwards; on their inner sides are four longish sharp teeth. The colour of the falces is like that of the cephalothorax.

The *maxillæ* are moderately long and straight, rather broadest at their extremities, which are somewhat obliquely truncated on the outer side, but a little inclined to the labium, and similar in colour to the falces.

The *labium* is short, of a semicircular form, and rather darker in colour than the *maxillæ*.

The *sternum* is heart-shaped, and like the falces and *maxillæ* in colour.

The *abdomen* is oval, tolerably convex above, and projects a little over the base of the cephalothorax; it is of a pale dull brownish hue on the upperside, and marked with two irregularly dentated longitudinal black bands, leaving a central longitudinal pale brownish band, more or less regularly dentated at its hinder half, where it often takes the ordinary form of a series of triangular markings or angular bars. The pale brown portions are more or less covered with bright white fleck-like spots; the sides are blackish, and the underside dull yellowish brown. The genital aperture is small, of a somewhat oval form, and is divided by a short, obtusely pointed process. The spinners are small, short, and of a dull yellowish hue.

The male resembles the female in colours and markings, but is smaller, and its legs are longer.

I have received examples of both sexes of this Spider from several parts of New Zealand, kindly sent to me by Mr. Faraday, Mr. A. S. Atkinson, Dr. Llewellyn Powell, and Captain F. W. Hutton.

*LINYPHIA PERAMCENA*, sp. n. (Plate LIII. fig. 12.)

Length of an adult male  $1\frac{1}{2}$  line, and of an adult female the same.

The *cephalothorax* is of a broad-oval form behind, the anterior part much narrower, the marginal constrictions on each side of the caput being moderate. Its colour is a dark reddish black-brown, getting paler on the fore part of the caput and towards the lateral margins, and leaving a well-defined, narrow, longitudinal, slightly tapering orange-yellow band along the middle, from the eyes to the posterior margin. The profile line from the eyes backwards forms a slight but even curve; the ocular area is rather prominent, owing to the strong tubercles on which the eyes are placed, and the height of the clypeus is nearly about half that of the facial space, or perhaps rather less. The caput is furnished on the upperside with a few hairs, directed forwards.

The *eyes* are of a dark grey hue, of tolerable and nearly equal size, excepting those of the fore-central pair, which are much the smallest; all are on black tubercular spots; those of the hind-central pair are rather further from each other than each is from the hind-lateral eye on its side, the interval being no more (if as much) than half a diameter. The anterior row, looked at from in front, is straight, though, from the much larger size of the lateral eyes, it looks as though a little curved, with the convexity of the curve directed backwards. The eyes of each lateral pair are placed contiguously to each other on a strong rounded tubercle, their direction being straight (that is, not oblique, as is commonly the case). The general position of the eyes

reminds one greatly of that of Spiders of the genus *Enyo*, being also more closely grouped together than those of the typical *Linyphia*. I think, however, without much doubt, that it belongs to *Linyphia*, resembling, most nearly, species of the "*circumspecta*" group. Those of the fore-central pair are separated by a small but distinct interval.

The *legs* are long and very slender, 1, 2, 4, 3; they are of a bright, rather orange-yellow colour, furnished with fine hairs and a very few fine spines, none of the latter, however, being on the metatarsi.

The *palpi* are short, similar in colour to the legs, excepting the digital joint, which is brownish yellow; the radial is much stronger than the cubital joint; each of these joints has on its fore side, directed forwards, among other shorter and less strong ones, a long, strong, curved, tapering bristle, the two spines running parallel to each other, that on the cubital joint being rather the longest. The digital joint is large, with a large lobe towards the base on the outer side. The palpal organs are prominent, complex, and directed outwards; at their base on the outer side is a strongish, somewhat crescent-shaped process, whose exact shape is not easily made out, though very characteristic; there are also other strong, bold processes underneath and at their extremity.

The *falces* are long, moderately strong, divergent at their extremities, and a little inclined backward to the labium. Their colour is dark yellow-brown, and they are armed with a few sharp, but not particularly strong, teeth on their inner sides towards the extremity.

The *maxillæ* and *labium* are of normal form, and similar in colour to the falces, while the *sternum* is darker-coloured, being as dark as the cephalothorax, excepting in the centre, which is rather paler than the rest.

The *abdomen* is oviform, nearly black, bordered on the upperside by a somewhat broken, dentated, narrow white band, with a longitudinal central series of strongish, well-defined, angular, dull yellow-brown markings, the two anterior ones being much the largest and confluent. The foremost, in fact, represents, both in its form and position, the normal marking, usually found in most Spiders, along the middle of the fore part on the upperside of the abdomen. The underside has also a narrow, marginal, slightly curved border on each side, of a dull colour flecked with white spots.

The female resembles the male in colour and markings. The genital aperture is of very characteristic form, and has three parallel, longitudinal, narrow processes running backwards in close proximity to the under surface of the abdomen; the central process is the longest and narrowest, and is placed between the others and the abdomen.

This Spider is allied to *Linyphia subdola*, and resembles it a good deal in the abdominal portion; but it is smaller, and the markings of the cephalothorax, as well as the palpi of the male and genital processes of the female, will serve to distinguish it readily.

Received from Capt. F. W. Hutton, from Wellington, N. Z.

*LINYPHIA MELANOPYGIA*, sp. n. (Plate LIII. fig. 13.)

Adult male, length  $1\frac{1}{3}$  line.

The *cephalothorax* is of a yellow-brown colour, rather the darkest on the caput, the lateral marginal constrictions of which are slight. The profile line forms a slight but even curve from the eyes backwards. The clypeus rather exceeds in height half that of the facial space, and there are a few short bristly hairs on the upperside of the fore part of the caput, towards and in the ocular area.

The *eyes* are of tolerable and nearly equal size, and (excepting the fore-centrals) of a pearl-grey hue; those of the posterior row are separated by very nearly equal intervals of less than a diameter of one of the hind-central pair, each of which last is separated by a diameter's distance from the fore-central opposite to it; those of each lateral pair are placed obliquely on a strongish tubercle. The fore-centrals are the smallest, and each of them is separated from the fore-lateral eye next to it by rather less than a diameter's interval.

The *legs* are moderately long and not very slender (1, 4, 2, 3 or 1, 2, 4, 3); some of the joints being lost, made it difficult to decide their relative length with accuracy. They are furnished with hairs and a few fine spines (none of the last being on the metatarsi); their colour is a uniform bright and rather orange-yellow.

The *palpi* are moderately long, similar in colour to the legs, excepting the digital joint, which is yellow-brown. The radial joint is somewhat shorter but stronger than the cubital; it is rather produced on its outer side a little in front, terminating in a bifid form, not very easy to make out clearly, excepting from certain points of view; but the upper portion of this part is tipped with blackish, and is the most prominent of the two. The digital joint is rather small, with a lobe on the outer side. The palpal organs are complex, with, among others, a long, strongish, curved, black-tipped, obtusely pointed spine-like process on their inner side, directed forwards and rather outwards.

The *falces* are similar in colour to the cephalothorax, strong, considerably prominent at their base in front, divergent, rather attenuated at their extremities, towards which is a strong sharp tooth on the inner side in front, with two or three much smaller, sharp denticulations behind it.

The *maxillæ* are strong, inclined to the labium, gibbous in front, and have one or two angular points or prominences, each surmounted by a bristle, on the gibbous portion. These angular prominences are peculiar and characteristic, but it is very probable that they are only sexual characters.

The *maxillæ* and *labium* are rather lighter-coloured than the falces, the sternum being of a similar hue to that of the cephalothorax, glossy, and furnished with a few strongish prominent bristles.

The *abdomen* is of a pale bright red colour, obscurely streaked (when in spirit of wine) with yellowish, and clothed thinly with coarse dark hairs, the posterior extremity, in the form of a strong ring round the spinners, being jet-black; the spinners are pale yellowish brown.

A single example of this distinct species (which appears to be allied to *Nerienne rubripes*, Bl.), was contained in the collection from New Zealand given to me by Mr. A. S. Atkinson.

Genus *MIMETUS*, Hentz (*Ctenophora*, Bl.).

*MIMETUS MENDICUS*, sp. n. (Plate LIII. fig. 14.)

Adult female, length rather more than  $2\frac{1}{2}$  lines.

The *cephalothorax* of this Spider is small, of a rather elongate-oval form, and slightly constricted on the lateral margins at the caput; the profile line forms a slight curve, sloping a little from the thoracic junction to the ocular area, which is broad, prominent on the middle and at the sides; the height of the clypeus is rather less than half that of the facial space.

The *eyes* are of tolerable and nearly equal size, distributed in three well separated groups, and seated on tubercles; the central group (consisting of the fore- and hind-central pairs) forms very nearly a square, and the fore-centrals are placed on a very strong projecting tubercular prominence; those of each lateral pair are contiguous to each other, oblique, and placed on a strong tubercle quite on the side of the caput. The interval between those of the hind central pair is rather less than an eye's diameter, being no more than half that which separates each from the hind-lateral eye on its side.

The colour of the *cephalothorax* is pale yellow, the caput, and some broken, oblique, converging lines on the thorax, being of a dark yellow-brown.

The *legs* are long and slender, 1, 2, 4, 3, those of the first and second pairs greatly the longest; they are similar in colour to the *cephalothorax*, spotted with dull yellow-brown and with a few darker annuli. The spiny armature of the first and second pairs is like that of the typical species, consisting of a row of very long prominent, strongish, slightly curved spines along the inner sides of the metatarsi and tibiæ, with three to five shorter and more curved ones between each two of them; the first of these is very short, the rest increasing gradually in length and strength.

The *palpi* are slender, moderately long, pale yellow, with a dark yellowish-brown annulus at the base of the digital joint.

The *falces* are long, rather slender, vertical, divergent, the basal half of a pale yellow colour, the rest deep yellowish brown.

The *maxillæ* are rather long, not very strong, straight, parallel to each other, of a dark brownish hue, paler at the extremities.

The *labium* is of a short oblong form, rounded at the apex, and similar in colour to the *maxillæ*.

The *sternum* is oval, truncated before, of a yellow colour, marked broadly round the margins with deep reddish yellow-brown oblique markings.

The *abdomen* is large, very convex above, with a bluntish sub-conical eminence on each of the highest parts. It was in bad condition, but appeared to be of an almost uniform whitish hue, with a large, dark, somewhat cruciform pattern on the hinder slope.

Received among other New-Zealand Spiders from Capt. F. W. Hutton.

?Genus *STEGOSOMA*, Cambr.

?*STEGOSOMA* *QUADRATUM*, sp. n. (Plate LIII. fig. 15.)

Adult female, length slightly over 1 line.

The *cephalothorax* is yellow-brown, darkest on the sides of the thoracic portion, which is also depressed, while the caput is elevated and its fore extremity produced and prominent; its slope at the occiput is abrupt and the clypeus is greatly impressed. The surface has the appearance of being thickly covered with minute shallow, but not very well-defined, pock-like marks, and the caput is clothed with coarse hairs.

The *eyes* occupy the whole of the fore part of the prominence of the caput; they are rather unequal in size; the four centrals form a largish square figure, the anterior (or fore-central) pair being much the largest; those of each lateral pair are contiguous to each other, and placed on the side of the prominence and rather far back, so that the hind-laterals come in a straight line with the hind-centrals, even if not a little further back still, and the intervals between those of the posterior row are nearly about equal.

The *legs* are short, rather strong, 4, 1, 2, 3. They are of a brownish-yellow colour, broadly, but not very distinctly annulated with deep brown, and are clothed with coarse hairs and slender bristles only.

The *palpi* are short and similar in colour and armature to the legs.

The *falces* are small, straight, parallel, and of a dull yellowish-brown hue.

The *maxillæ* are small and greatly inclined over the *labium*, which is of an oval form, somewhat blunt-pointed at the apex; these parts are of a paler hue than the falces.

The *sternum* is of a subtriangular heart-shape, dark brown, thickly covered with shallow pock-marks and clothed with coarse hairs.

The *abdomen* is very large, of a somewhat quadrate form, flattish on the upperside and with a steep hinder slope; the latter marked with several distinct transverse folds in the cuticle towards the spinners. On each side of the hinder extremity above is a large blunt-pointed subconical prominence, directed outwards and backwards. At each corner of the fore extremity is a very much smaller somewhat angular prominence, and about halfway between each of these and the large posterior one is another of the same size. The whole of the surface of the abdomen is thickly covered with minute circular, somewhat shining pock-like marks; but in the absence of a high magnifying-power I could not satisfactorily determine whether they are actually depressed or not; the abdominal surface is also clothed with very short hairs.

The colours and markings of the abdomen appear to vary considerably in different examples. In the one figured the whole of the underside and the greater part (forwards) of the upperside is of a deep brownish-black hue, marked with three spots, in the form of a

triangle, on the middle of the fore part, and two large, somewhat triangular patches, one on each side, between the two anterior angular prominences, of a cream-yellow colour; the hinder part of the abdomen is of pale yellow-brown hue, mottled with blackish brown near the darker surface of the fore part. Another example was somewhat similarly marked on the abdomen, but had an altogether yellowish hue, the cephalothorax, palpi, and legs being yellow, without any markings or annulation whatever. A third example has the abdomen of a shorter form, more convex above, and the posterior conical eminences very much smaller and shorter, scarcely larger than the anterior ones. The whole of the upper surface and sides are of a dull cream-colour, with four dark reddish-brown spots in the form of a trapezium in the middle, and a few veiny lines of the same hue: also at the fore extremity is a dull reddish-brown transverse band, and a few irregular markings of the same colour on the sides; the legs and palpi are annulated. I am more than half inclined to think this example may be of a different species; but at present it will be best to leave it where it is.

An adult male accompanying the above three examples is rather smaller, the abdomen much more flattened, of a uniform deep reddish black-brown, with a few obscure yellowish spots and markings on the upperside, and the posterior prominences intermediate in length and strength between those of the first and second of the females above described; the caput is more elevated and prominent, and the cephalothorax is of a uniform dark red-brown colour. The palpi are rather long and strong; the cubital joint is short and bent, the radial shorter but prominent behind; the digital joint is very large and of ordinary form, its convex sides are directed inwards; and the palpal organs are rather complex and encircled by a strongish spine.

The examples above described of this interesting little Spider were sent to me by Capt. F. W. Hutton, from the west coast of Otago, New Zealand. I am not satisfied with respect to the generic position here given to this Spider, which has a close affinity to *Phoroncidia*, Westw., as well as to *Stegosoma*, Cambr.

#### FAM. THLAOSOMIDES.

##### Genus THLAOSOMA, Cambr.

##### THLAOSOMA ATKINSONII, sp. n. (Plate LII. fig. 7.)

Adult female, length 3 lines, breadth of abdomen at the widest part  $3\frac{1}{2}$  lines.

The general form of this Spider resembles very nearly that of others of this curious genus, but it may be readily distinguished by its colours and markings as well as by the special form of the abdominal protuberances.

The fore part of the caput is upturned, ending in a subconical point, and bearing the four pairs of minute eyes, in the usual position. The colour of the cephalothorax is of a whitish-yellow or pale cream hue, marked on the sides with dusky yellowish brown, leaving

a broad central longitudinal band marked with yellowish brown just behind the eyes.

The region of the thoracic junction is a little raised and divided into two subconical points by a longitudinal cleft.

The *legs* are rather short, their relative length 1, 2, 4, 3; those of the first and second pairs are much the longest and nearly equal in length; the femoral joints strong, and armed along the outer side with two rows of very minute spinous tubercles. The colour of the legs is similar to that of the cephalothorax, obscurely annulated with pale yellowish brown and marked irregularly with red-brown. The tarsi terminate with three claws, each one differing from the rest in strength and curvature.

The *palpi* are short and similar to the legs in colour and markings.

The *abdomen* is very large, and irregularly humped or protuberant on its surface; the two leading protuberances are on each side towards the fore part of the upper side, very divergent, and rather directed backwards, the most prominent outer part of each being slightly pointed. The ground-colour of the abdomen is similar to that of the legs, broadly mottled and marked with a greyish yellow-brown hue, chiefly in a transverse direction, just in front of and including the two main protuberances, as well as on the sides, where a bold and obliquely striped appearance is given; in the middle of the hollow of the fore extremity (which projects partly over the base of the cephalothorax) is a largish oblong dark reddish-brown patch. The spinners are short, compact, and of a dark reddish-brown hue.

A single example of this Spider (the first I have seen of the genus from New Zealand) was contained in the collection kindly brought to me by Mr. Atkinson in 1878.

*THLAOSOMA HECTORI*, sp. n. (Plate LII. fig. 8.)

Adult female, length very slightly over 2 lines; breadth of abdomen at the widest part  $3\frac{1}{2}$  lines.

This species may be distinguished from *Thlaosoma atkinsonii* not only by its smaller size, but by the greater proportionate breadth of the abdomen, which, while bearing a somewhat similar general resemblance, is much more shrunken and pinched, giving it a still more boldly protuberant appearance. The outer sides of the posterior extremity of the abdomen are also very prominent. The cephalothorax and legs are of a dull, somewhat olive-tinged yellowish hue; the sides of the caput are rather darker, and the legs, which are considerably longer than those of *T. atkinsonii*, have a very faint appearance of clouding, or annulation, with dull yellowish brown. The abdomen is of a dull yellowish colour, clouded with dark yellow-brown, and strongly tinged on the fore part with dark rusty brown.

A single specimen was received in 1879 from Captain F. W. Hutton, by whom it was found at Dunedin, New Zealand.



## Fam. EPISINIDÆS.

## Genus EPISINUS.

EPISINUS ANTIPODIANUS, sp. n. (Plate LIII. fig. 16.)

The length of the adult female is  $2\frac{1}{3}$  lines.

This Spider is nearly allied to *Episinus truncatus*, Walek., but may easily be distinguished by its shorter and distinctly annulated legs, and by a difference of pattern on the cephalothorax and abdomen. The form of those parts is, however, very similar in both species, as also are the relative size and position of the eyes. The ocular area, however, is a little more projecting in the present Spider.

The colour of the *cephalothorax* is dark yellow-brown, the margins and a patch on each side, near the junctional line of the caput, being pale dull yellowish.

The *legs* are dull yellowish, distinctly annulated with dark brown, the broadest and darkest annuli being at the extremities of the femora and tibiæ. Their relative length is 4, 1, 2, 3; and they are furnished with hairs, a slender spine on the genua, and two on each of the tibiæ.

The *sternum* is dark blackish brown, with a small, pale, dull-coloured patch at the middle of the anterior extremity.

The *abdomen* is yellow-brown, mottled and marked with darker brown, blackish, dull yellowish, and white points. A tolerably regular pattern may be traced, formed by slender angular whitish lines, the vertices of the angles directed forwards; the two longest of these lines start from the conically-prominent posterior angles of the upper-side of the abdomen, and meet in an acute angle towards the fore extremity; two shorter ones also proceed from the same parts, and meet much further back in a more obtuse angle, within which is a black triangular patch enclosed by a whitish basal line; the four lines above mentioned form a large triangular figure, within which, in a transverse line, are two impressed red-brown spots margined with pale yellowish. Along the middle of the underside is a broad brownish band, marked along the middle with pale yellowish brown, and margined on the sides and behind with a pale continuous stripe; and the sides, beneath the angular prominences, are strongly and conspicuously marked with black.

The form of the genital aperture is characteristic and quite different from that of *Episinus truncatus*.

Received from the west coast of Otago, where it was found by Captain F. W. Hutton.

The occurrence of an undoubted *Episinus* in New Zealand is very interesting, and appears to me to give us a pretty certain clue to the true affinities of this genus. In 'Spiders of Dorset,' p. 80, I have alluded to the resemblance of *Episinus* to some species of the Australian genus *Stephanopsis*, Cambr., and observed that though in South America *Episinus* occurs in company with Spiders intermediate between it and *Stephanopsis*, it had not yet been recorded from Australia. The occurrence now, however, of *Episinus* in a region

where *Stephanopsis* also occurs leads me to remove the former from Theridiides, where its position has always appeared to be very anomalous, and to form a distinct family of it, next to Stephanopides.

*List of Spiders above described and recorded, with references to page, plate, and figures.*

- Arbanitis huttonii*, sp. n., p. 682, Pl. LII. fig. 1.  
*Migas distinctus*, sp. n., p. 683, Pl. LII. fig. 2.  
*Huttonia* (g. n.) *palpimanoides*, sp. n., p. 685, Pl. LII. fig. 3.  
*Robsonia* (g. n.) *marina*, Hector, p. 687, Pl. LII. fig. 4.  
*Argyrodes lepida*, sp. n., p. 688, Pl. LII. fig. 5.  
*Lithyphantes lepidus*, sp. n., p. 690, Pl. LIII. fig. 9.  
*Atkinsonia* (g. n.) *nana*, sp. n., p. 691, Pl. LIII. fig. 10.  
*Phycosoma* (g. n.) *ecobioides*, sp. n., p. 692, Pl. LIII. fig. 6.  
*Walckenaëra cristata*, Bl., p. 693.  
*Linyphia subdola*, sp. n., p. 693, Pl. LIII. fig. 11.  
 — *peramena*, sp. n., p. 694, Pl. LIII. fig. 12.  
 — *melanopygia*, sp. n., p. 696, Pl. LIII. fig. 13.  
*Mimetes mendicus*, sp. n., p. 697, Pl. LIII. fig. 14.  
 ? *Stegosoma quadratum*, sp. n., p. 698, Pl. LIII. fig. 15.  
*Thlaosoma atkinsonii*, sp. n., p. 699, Pl. LII. fig. 7.  
 — *hectori*, sp. n., p. 700, Pl. LII. fig. 8.  
*Episinus antipodicanus*, sp. n., p. 701, Pl. LIII. fig. 16.

EXPLANATION OF THE PLATES.

PLATE LII.

Fig. 1. *Arbanitis huttonii*, sp. n., ♂.

*a*, profile, with legs and palpi truncated; *b*, right palpus on outer side, and rather behind; *c*, natural length of Spider.

2. *Migas distinctus*, sp. n., ♀.

*a*, eyes from above and behind; *b*, natural length of Spider.

3. *Huttonia* (g. n.) *palpimanoides*, sp. n., ♀.

*a*, Spider in profile, with legs and palpi truncated; *b*, front view of eyes and falces; *c*, underside of cephalothorax, with legs and palpi removed, showing the form of the maxillæ, labium, and sternum; *d*, left palpus from in front; *e*, genital aperture; *f*, underside of posterior extremity of abdomen; *g*, natural length of Spider.

4. *Robsonia* (g. n.) *marina*, Hector, ♂.

*a*, profile, without legs and palpi; *b*, eyes from above and behind; *c*, maxillæ, labium, and sternum; *d*, right palpus from outer side and rather behind; *e*, spinners; *f*, natural length of Spider, the dotted portion showing the length of the falces.

5. *Argyrodes lepida*, sp. n., ♀.

*a*, Spider in profile; *b*, natural length.

6. *Phycosoma* (g. n.) *ecobioides*, sp. n., ♀.

*a*, profile; *b*, natural length of Spider.

7. *Thlaosoma atkinsonii*, sp. n., ♀.

*b*, profile; *c*, eyes from in front and rather underneath; *d*, abdomen from behind; *e*, natural length and breadth.

8. *Thlaosoma hectori*, sp. n., ♀.

*a*, natural length and breadth.

PLATE LIII.

Fig. 9. *Lithyphantes lepidus*, sp. n., ♂.

*a*, profile; *b*, eyes from in front; *c*, natural length of Spider.

10. *Atkinsonia* (g. n.) *nana*, sp. n., ♂.

*a*, profile; *b*, eyes from in front; *c*, maxillæ, labium, and sternum; *d*, natural length of Spider.

Fig. 11. *Linyphia subdola*, sp. n., ♀.

- a*, profile; *b*, eyes from in front; *c*, ♂, without legs or palpi; *d*, left palpus of male; *e*, genital aperture of ♀; *f*, natural length of ♂; *g*, ditto of ♀.
12. *Linyphia peramæna*, sp. n., ♂.  
*a*, profile; *b*, eyes from in front; *c*, right palpus on outer side; *d*, genital aperture; *e*, natural length of Spider.
13. *Linyphia melanopygia*, sp. n., ♂.  
*a*, profile; *a'*, falces and maxillæ in profile, more enlarged; *b*, fore part of cephalothorax and falces from in front; *c*, right palpus in front, looking upwards; *d*, left palpus (wanting digital joint) on outer side, from underneath in front; *e*, natural length of Spider.
14. *Mimetus mendicus*, sp. n., ♀.  
*a*, profile; *b*, portion of metatarsus, enlarged; *c*, genital aperture; *d*, natural length of Spider.
15. *Stegosoma quadratum*, sp. n., ♀.  
*a*, profile; *b*, natural length of Spider.
16. *Episinus antipodianus*, sp. n., ♀.  
*a*, profile; *b*, eyes from in front; *c*, genital aperture; *d*, natural length of Spider.

## 8. On some African Species of Lepidoptera belonging to the Subfamily *Nymphalinae*. By W. L. DISTANT.

[Received November 11, 1879.]

(Plate LIV.)

The Butterflies referred to and described in this paper are principally (including all the types) in the collection of Mr. F. J. Horniman, and are from the same region as the Papiliones described in a previous paper (*suprà*, p. 647), viz. the Calabar district (Isubu, Mongo-ma-lobah, Calabar). They formed portion of probably the largest number of West-African specimens ever gathered together at one time, and consequently an unusual opportunity has been afforded of testing the constancy and variability of many described forms.

### DIADEMA ANTEVORTA, n. sp.

♀. Above bluish black. Fore wings with a curved blue fascia, commencing somewhat faintly, and extending transversely across cell about midway, and continued broadly between the two lower median nervules for about half their length, when it is suddenly and abruptly carried downwards and terminates near anal angle; a white transverse band commencing a little beyond end of cell, and terminating a little below centre of upper median nervule; a submarginal row of eight white spots, divided by the nervules (upper two situated close together, fourth smallest), and a marginal row of white streaks situated on each side of the nervules, but obliterated near apex. Lower wing crossed by a central blue fascia, which commences near anterior angle and terminates at about centre of abdominal margin; a marginal row of white streaks divided by the nervules as in upper wings, but becoming bluish towards anal angle. Underside pale brownish; markings as above, but blue fascia of upper wings pale

bluish white and abbreviated; the transverse blue fascia of lower wings much narrowed and white.

Exp. wings 4 inches.

Hab. Magila, East Africa.

In structure resembling the ♀ of *D. salmacidis*, Dr.

DIADEMA DINARBA, Hew. Ex. Butt. iii. *Diad.* t. 2. f. 7 (1865).

This species seems subject to extreme variation, and, as far as I have been able to examine specimens, appears under the following forms:—

Var. *a*. Typical. Hew. ib.

Var. *b*. Fore wings with transverse spots much enlarged, almost reaching row of submarginal spots. Hind wings with basal white portion enlarged, and almost occupying half of wing.

Var. *c*. Fore wings with transverse spots enlarged and fused, occupying the whole discal portion of the wing, and merging with submarginal row of spots, some of which are absorbed. Hind wings with the basal white portion now increased till it occupies all the wings but a broad outer margin.

Var. *d*. Both wings almost wholly white. The dark portions of the previous varieties only indicated, and the submarginal row of spots almost obliterated.

Hab. Vars. *a*, *b*, *d*, Calabar; var. *c*, Sierra Leone.

It will be thus seen that variation extends from the melanic form, *a*, through gradually increasing albinism, till the extreme form, *d*, is reached; or, of course, *vice versa* from *d* to *a*. Besides which, though these typical varieties are indicated, there are numerous intermediate forms which destroy their value as to constancy. Similar variation may be seen in another African species of the genus, *D. dubium*, Beauv., some of the forms of which are regarded by competent lepidopterists as specific.

#### PARADIADEMA, gen. nov.

Allied to *Diadema*, from which it differs in the hind margin of the fore wings being scarcely excavated, and the apical angle of the same, which is only faintly prominent; lower subcostal nervules emitted nearer apical margin; costa of hind wings more arched, precostal nervure curved outwardly.

#### PARADIADEMA HORA, n. sp. (Plate LIV. fig. 1.)

♂. Above ferruginous. Fore wings crossed by a transverse white fascia, commencing near costa a little beyond end of cell, and terminating a little below centre of hind margin; this fascia is straightened outwardly, but inwardly, near end of cell, deeply toothed; interior of cell bluish black, with four or five white spots, outer one somewhat linear and perpendicular. Hind wings crossed by a broad yellowish-white fascia toothed outwardly, and widened towards inner margin. Underside much paler in colour, fasciæ as above; cell of fore wings with the white spots bordered with black, a black spot near base, and two irregularly waved black lines, situated

some distance apart near the centre; beneath cell, and a little below base of lower median nervule, is situated a black ring. Hind wings with two black spots near base, between costal nervure and first sub-costal nervule, and an 8-shaped black mark on basal half of cell.

Exp. wings  $3\frac{2}{10}$  inches.

*Hab.* Camarouns.

The ♀ resembles the ♂, but is larger.

*ROMALEOSOMA EDWARDSI*, Hoev.

*Nymphalis (Aterica) edwardsii*, Tijd. Nat. Ges. xii. p. 252, t. 4. f. 1 a, b (1845); Kirby, Cat. Diurn. Lep. p. 248. 12 (1871).

*Romaleosoma pratinas*, Doubl. & Hew. Gen. D. L. t. 38. f. 3 (1850); Kirby, Cat. Diurn. Lep. p. 247. 5 (1871).

These two described forms are certainly synonymic, as may be at once seen by a comparison of the figures. The mistake originated in the arrangement of the species of this genus by Doubleday and Hewitson in the Gen. D. L. p. 284. *R. pratinas* is included in the Sect., "body extremely robust, and marked on the upperside with large pale spots;" whilst *R. edwardsi* is placed in another Sect., "body less robust, not marked with pale spots," which is clearly erroneous, and seems to show that the figure of the last species was not consulted.

*ROMALEOSOMA LOSINGA*, Hew. Ex. Butt. iii. *Rom.* t. i. f. 5 (1864).

*Romaleosoma wardi*, Druce, Cist. Ent. i. p. 286. n. 5 (1874).

Mr. Hewitson described this species as having on underside of fore wings "three black spots (forming a triangle) within the cell," and posterior wings as having "a single black spot within the cell." Only one specimen which I have examined in the collection has a single spot only in cell of hind wing, and that specimen differs in only having two spots in cell of fore wing. Some specimens possess two spots in cell of hind wings, and some three; others have three in cells of fore and hind wings, and a transverse black fascia across end of cell. One specimen has a fourth spot on hind wing situated outside cell. In most specimens there is also a well-marked violet reflexion on upperside of hind wing near inner and hind margins, particularly the last.

It will thus be seen that some of these forms agree with *R. wardi*, Druce; others, on the underside, with *R. losinga*, Hew. The cellular markings are evidently most inconstant, the violet reflexions above more pronounced in some species than others, and therefore I have been unable to separate the two species without adding varieties which would destroy the value of each.

*ROMALEOSOMA LAKUMA*, Butl. Trans. Ent. Soc. 1870, p. 123; Lep. Ex. i. t. 21. f. 2 (1871).

This form is most inconstant in markings: in some male specimens the blue striæ on anterior wings is absent; in some female specimens the discal blue streak extends at its base from abdominal margin to

hind margin, as in *R. harpalyce*. Again, there is another variety which differs from *R. lakuma* in the greater width of the narrow oblique subapical ochreous band, and in the total absence of bluish markings above; underside agreeing perfectly with that of *R. lakuma*. This has been recently described by M. Mabille (Bull. Soc. Zool. de France, 1876, p. 278) under the name of *R. spatiosum*. In some specimens of this form there are faint pale violet indications of the blue stræ in *R. lakuma*.

Mr. Butler, in Lep. Ex. p. 52, writes, *R. lakuma* "is allied to *R. eupalus* and *R. harpalyce*, which have been considered by some lepidopterists to be varieties of the same species; but I am convinced, from a careful examination of many examples of both sexes of the two forms, that they are perfectly distinct. *R. losinga* is a third species of the same little group, and *R. lakuma* will make a fourth." Since this was written, *R. wardi* and *R. spatiosum* have been described, which bring the number of described forms of this group to six.

They seem to be thus differentiated:—

Wings generally marked with blue above.

Apex of fore wings without or with very obscure yellow band.

White markings on underside faint and obscure ..... *R. harpalyce*.

White markings on underside very distinct ..... *R. eupalus*.

Apex of fore wings crossed with yellow band ..... *R. lakuma*.

Wings without or with faint blue markings above.

Apex of fore wings crossed with yellow band.

White markings on underside very distinct ..... { *R. losinga*.

White markings on underside faint and obscure ..... { *R. wardi*.

..... *R. spatiosum*.

Having examined the large number of duplicates that were in the possession of Mr. Horniman, and finding the above characters very inconstant, I much more incline to the opinion that we are dealing with the varietal forms of a protean species. The remarks of Smeatham, communicated to Drury, as to his own personal observations, may well be reproduced:—"There are several Papiliones nearly of this colour, that is to say, with the upperside of the wings having a changeable purple, and the undersides being inclinable to green, &c. The differences between them arise so gradually that I think them varieties of the same species, some, apparently very different, being found coupled together." Much of the same kind of variation may also be seen in *Euryphene phantasia*, Hew., from the same region.

ROMALEOSOMA INANUM, Butl. Cist. Ent. i. p. 158 (1873).

Three specimens of this form were in the collection. The first perfectly agrees with the description; the second is without the black spot in cell of hind wings; and the third specimen has the sub-marginal row and other spots beneath as in *R. ceres*, Fab.

HARMA LUCASII, Doum. (*Nymphalis*) Rev. Zool. 1859, p. 262, t. x. f. 2, ♀ ♂. (Plate LIV. fig. 2.)

I am glad to be able for the first time to describe the male of

this fine species; it seems to have been a difficult insect to procure. Doumet described and figured the female only.

♂. Wings above bright orange, narrowly edged with black on outer margins and along costa of fore wings, excepting basal half, where it is almost concolorous. A large triangular black space, the apex of which commences on the fore wings about centre of inner margin and a little above submedian nervure, extending through lower wing, on outer side to anal angle, and on inner side to abdominal margin about one third from base. Underside pale ochreous; lower wings greyish for about two thirds their expanse from base; both wings crossed by a straight, oblique chocolate-brown band, which commences on costa of fore wing a little beyond cell, and is continued to anal angle of lower wings. Cell of fore wings with two waved black lines some distance apart, the first of which is situated about midway, and a waved black line beyond end of cell, which also terminates in a black line; a black line, enclosing a small rounded space, situated just below cell between submedian nervure and lower median nervule. Cell of lower wings with three transverse black lines, the first of which is somewhat waved. The black band along underside of fore wings is somewhat reflected on upperside.

Exp. wings  $2\frac{9}{10}$  inches.

Hab. Isubu, Camaroons.

#### HARMA FREDERICA, n. sp. (Plate LIV. fig. 3.)

♀. Above like *H. æmilius*, Doum., but the two submarginal rows of spots united with each other and also with the discal band, which is broken, and thus forms a series of eight ray-like streaks occupying outer half of fore wings, of which the upper is very small and obscure; sixth and seventh largest, eighth situated on inner margin and shortened outwardly. The number of these streaks on lower wings is seven; the first almost hidden by inner margin of anterior wings; the base of the fourth occupies apical third of cell; the last is situated between submedian nervure and lower median nervule. Underside agrees with *H. æmilius* in general coloration, but markings as on upperside. Cells without markings.

Exp. wings  $4\frac{1}{10}$  inches.

Hab. Calabar district, but not precisely localized.

HARMA BECKERI, Herr.-Schff. (*Diadema*) Ex. Schmett. f. 81 (1852, 1858).

*Aphidema beckeri*, Kirby, Cat. Diurn. Lepid. p. 229 (1871).

*Harma theodota*, Hew. Ex. Butt. iii. Har. t. 1. f. 3, 4 (1864).

Mr. Hewitson, *ib.* (text), stated his conviction that the *Diadema beckeri*, H.-S., was really a species of the genus *Harma*. Mr. Rutherford, some time ago, told me he considered it was really the female of *H. theodota*, Hew., and I think he was doubtless right in so placing it. The name proposed by Herrich-Schäffer therefore takes precedence.

*HARMA THEOBANE*, Doubl. & Hew. Gen. D. L. t. 40. f. 3 (1850); Hopff. Pet. Reise, Zool. v. p. 389, t. 24. f. 1-4 (1862).

Both sexes of this species are extremely variable. The male varies much in colour beneath; in some specimens the oblique discal line crossing both wings is bordered outwardly and broadly by a dark fuscous, waved, and irregular fascia. In some specimens of the female above the white markings are almost absent, and the wings are of an almost uniform smoky hue.

*CHARAXES AGABO*, n. sp. (Plate LIV. fig. 4.)

♀. Above bluish black, both wings crossed by a wide yellowish-white discal fascia, commencing where it is narrowest on fore wings, immediately beneath upper median nervule, and extending through hind wings, where it is broadest and almost reaches base, to abdominal margin; this fascia is outwardly situated on fore wings, but regularly curved on hind wings. On fore wings two spots situated transversely rather more than halfway between end of cell and apex; one smaller subapical one and eight small marginal spots, of which the lowest are the largest, yellowish white. Hind wings with a triangular yellowish-white spot on abdominal margin below central fascia; a submarginal row of eight blue spots, becoming larger and more rounded towards apical angle, and a marginal row of blue sub-crescentic narrow fasciæ, bordered outwardly with black, and becoming ochreous between inner tail and anal angle.

Underside: front wings black, with the following silvery-white markings:—A basal costal streak; three parallel cellular spots, gradually increasing in size from base, and preceded by two small bluish ones; immediately beneath cell a basal streak, followed by a small spot; beyond cell a subcostal boot-shaped spot, divided midway by a nervule, followed by a large suboblong spot, divided into three parts by nervules. A submarginal row of seven spots, of which the first five are silvery white, and sixth and seventh ochreous; the first three only divided by nervules; fourth and fifth much the smallest; and a marginal row of eight small spots, the lower two being largest, slightly bluish and crescentic inwardly. Hind wings silvery white, having two broad inwardly-curved black fasciæ, both commencing on costa, first terminating on centre of abdominal margin, second passing through end of cell, and terminating along lower median nervule at commencement of posterior marginal band. These two fasciæ are connected transversely, narrowly on costa and broadly near anal angle, and have also a connecting fascia of the same colour which commences about centre of the first, and is forked posteriorly where it joins second near base. A wide black marginal band, containing, first, a row of six narrow transverse ochreous lines, followed by six large silvery spots and a series of bluish-grey marginal lines; between lower median nervule and anal angle the band is represented by a large ochreous spot, margined with black, and containing two black spots ocellated with blue. Body streaked with silvery white.

Exp. wings  $4\frac{4}{10}$  inches.

*Hab.* Calabar district; but not precisely localized.



P.S. (Dec. 15th, 1879).—I had in this paper described a species of *Charaxes* from West Africa under the name of *C. galba*, which, in a memoir since published by Herr Dewitz, has been described by that gentleman under the name of *C. hildebrandti*. Its nearest allies are *C. andara*, Ward, from Madagascar, and the Indian species *C. fabius*, Linn.

## EXPLANATION OF PLATE LIV.

Fig. 1. *Paradiadema hora*, p. 704.

2. *Harma lucasii*, p. 706.

Fig. 3. *Harma frederica*, p. 707.

4. *Charaxes agabo*, p. 708.

9. Description of a new Oriole from Borneo. By R. G. WARDLAW RAMSAY, F.Z.S., M.B.O.U., Lieutenant 67th Regiment.

[Received October 30, 1879.]

## ORIOULUS CONSOBRINUS, sp. n.

♀. Allied to *Oriolus xanthonotus*, but differs in having the head, sides of the face, and ear-coverts smoky cinereous. The yellowish-brown edgings to the wing-coverts are also wanting; but this is not a constant character even in *O. xanthonotus* ♀, for some examples do not possess it in the smallest degree. The third, fourth, fifth, and sixth primaries are margined and tipped with pale greenish yellow. The rump has an appearance of being tinged with reddish brown, many of the feathers being of that colour. The lower surface is of a much purer white, with a cinereous tinge on the throat. The lower tail-coverts and tail are as in *O. xanthonotus*.

Length (♀, dry skin) 6·5 inches; tarsus ·75; wing 4; tail 2·75; bill from gape ·85.

It is more than probable that the male will be found to resemble that of *O. xanthonotus*, but possibly with the upper tail-coverts reddish or rusty brown.

The comparative measurements I do not consider of much importance, inasmuch as examples of *O. xanthonotus* from Malacca, Sumatra, S.E. Borneo, Sarawak, and the Philippines, although apparently identical with the typical Javan species, vary much in size *inter se*.

The specimen from which my description is taken was in a collection, labelled N.E. Borneo, in the museum of the late Lord Tweeddale.

I am indebted to Mr. R. B. Sharpe, of the British Museum, for informing me that this collection was made in the district of Sandakan, in Northern Borneo.

10. On the Question of the Identity of Species of the Common Domestic and the Chinese Goose. By F. B. GOODACRE, M.D., F.Z.S.

[Received September 16, 1879.]

Having read long ago, in 'The Origin of Species' (p. 275), about the fertility *inter se* of "hybrids" between the Common Domestic and Chinese Geese, I was induced, when the opportunity occurred some few years ago, to commence a series of experiments to verify this alleged fertility, several gentlemen very kindly consenting to assist me in the investigation. The following crosses have been obtained by one or another of us, and some of them in more than one case:—Chinese ♂ with Common ♀ produced several Goslings; a pair of these, out of the same nest, have produced young last year and again this; half-bred ♂ with both Common ♀ and Chinese ♀; one quarter Chinese and three quarters Common ♂ with both Common ♀ and Chinese ♀.

The number of the Goslings in proportion to that of the eggs has been small in many, but not in all cases, and is, I think, to be attributed to some accident in our arrangements, and not to any lurking sterility between the two forms. In fact I suspect the two forms themselves, and cross-bred birds of them in any proportions, to be quite as fertile *inter se* as either of the pure forms by itself.

Now the chief interest in the results of these experiments seems to be that half-bred birds of the same nest produced young; for, as a consequence of their doing so, we seem compelled to believe one of two things, either that hybrid birds can be fertile *inter se*, or that the half-bred birds above mentioned were not hybrids at all, but only mongrels; in other words, that the two forms of Domestic Goose are specifically identical. Most naturalists have hitherto considered them specifically distinct; it is certain they either are or are not; and how is the case to be decided? The declaration of the most learned naturalists either way cannot settle the point, nor do I see any way of doing so beyond all doubt if we give up that rule, so generally received, that hybrids are infertile *inter se*, and, of course, we cannot quote that rule as a *proof* against an apparent exception to itself. Yet the fertility of these cross-bred birds may be taken as *good presumptive evidence* in favour of identity of species in their parent forms, and is quite sufficient to make us inquire more curiously into the matter, to see what other evidence can be found to incline us to believe in such identity. The advocates of their non-identity would very naturally call our attention to the great difference between them as to general form, colour, and voice, to the peculiar knob on the Chinese bird's head, and to its prolonged season of incubation. The existence of the last of these differences (except in books) I have good reason to deny; the other differences must be admitted, and something said with reference to each to show

that they do not absolutely render identity of species improbable. Great as may be the difference of general form, is it greater than that between a Carrier and a Tumbler Pigeon, or between a Greyhound and a Pug among Dogs? As to voice, the Call Duck, Trumpeter Pigeon, and Common Dog all afford instances of modification of voice in a greater or less degree, from the normal voice of the Wild Duck and Rock-Dove in the first two cases, while the bark of the Dog is said to be a domestic accomplishment altogether, but is never supposed to divide Dogs into two species, those that bark and those that cannot; for the young of the latter learn to bark in this country. As to colour, it should be borne in mind that sandy-coloured Geese are not infrequent in some parts. The stripe down the back of the neck of the Chinese Goose is a very distinctive marking; but it may well be asked if it is necessarily of greater value as a specific distinction than the spinal stripe in certain Horses, especially those of a dun colour. The knob on the base of the bill of the Chinese bird is doubtless the greatest distinguishing mark between the two forms.

In the opinion of most naturalists, the Grey-lag Goose is the wild original of our common domestic bird; and from Yarrell we learn that its range extends to China and Japan. The same author also points out its clear grey shoulder as a characteristic of the Grey-lag, distinguishing it from the most nearly allied British wild Geese; and, curiously enough, this is very evident in the Chinese bird. The trachea of the male in most Swans, Geese, Ducks, and Mergansers is a most trustworthy guide as to specific difference: but in the case under consideration it appears to be of little use; for there is good ground for suspecting that the form of the trachea in the Grey-lag is not constant. Yarrell says:—"In the wild Grey-legged Goose the tube of the windpipe is nearly cylindrical; and this form of trachea I have frequently found on examination of domestic Geese intended for the table; but I have frequently also found the tube flattened at the lower portion" (Yarrell's Brit. Birds, vol. iii. p. 55). The tracheæ of two Chinese Ganders which I have myself examined were very slightly swelled and flattened at the lower portion. I have not had the opportunity yet of examining that of a Chinese Goose; the windpipes taken from cross-bred birds condemned for the kitchen, without regard to sex, have all had a very decided swelling and flattening of the lower portion of the tube. In Chinese Geese there is generally a small rim of white feathers at the base of the bill; and a broader band is far from uncommon in the ordinary Domestic Goose. This and the swelled and flattened trachea have been rightly looked upon as analogous variations; but perhaps the cause of their occurrence has been too readily accounted for by Yarrell and others by supposing an admixture of blood from the "White-faced Goose" in the building-up of the domestic form in remote times. May it not be that there is a tendency in the Grey-lag to vary in these directions, and that hence such a tendency reveals itself also in the Chinese form?

It may, I know, be asked, If the Chinese form was modified out

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of the Grey-lag, how came there to be wild Chinese birds? To which it may be replied, Is it certain that there are any? may not the supposed wild specimens be only feral? If so, it would be a somewhat similar case to feral "chequered" Rock-Doves, as far as regards breeding for generations without reverting to the original type.

The fertility between these two forms of Domestic Geese reminds me forcibly of the same thing between divers so-called species of wild Pheasants, as shown by Mr. Tegetmeier; and I am inclined to accept his solution of the mystery as applicable to Geese also.

Of course I do not pretend to be able to *prove* the specific identity of the Common and the Chinese Goose; but I think what I have said may be taken as evidence that such a theory is really not so absurd as it may at first sight appear to be.

The doctrine of specific identity of certain very diverse forms of animals appears to me one deserving of careful study; and every case that may be supposed to illustrate it in a marked way seems of importance towards attaining what we ought all to be seeking—the truth. Hence the fertility of the offspring of Common and Chinese Geese may teach us lessons of general interest and importance in zoology.

Great variations of a species are chiefly to be observed in domestic animals; but we err if we suppose they do not occur among wild ones, although doubtless many are masked from our observation by their receiving specific names when in reality they are nothing more than varieties or geographical races.

In conclusion I will briefly state that there are three points, in the cross-bred Geese themselves which we have been considering, which incline me to look on them as mongrels. According to the laws of hybridity one would have expected the trachea to be intermediate between the parent forms (as it is in hybrids of the Musk-Drake with the Common Duck), and the knob on the bill and the stripe on the neck to be quite suppressed; now none of these things happen.

I shall be glad to hear that any zoologist is willing to turn his attention towards solving the mystery that certain so-called hybrids produce fertile offspring (which most do not); for this seems always to happen in cases in which the right to specific distinction is questioned by some naturalists.

Wilby Rectory, Norfolk,  
September 1879.

December 2, 1879.

Prof. A. Newton, F.R.S., Vice-President, in the Chair.

The Secretary made the following report on the additions to the Society's Menagerie during October 1879:—

The total number of registered additions to the Society's Menagerie during the month of October was 133, of which 2 were by birth, 93 by presentation, 30 by purchase, 4 were received in exchange, and 4 on deposit. The total number of departures during the same period, by death and removals, was 119.

The most noticeable addition during the month was

An example of Elliot's Guinea-fowl (*Numida ellioti*), purchased October 2nd. This is the first living example we have yet acquired of this peculiar Guinea-fowl, which was first described in the Society's Proceedings for 1877, p. 652, by Mr. Bartlett. It was transmitted from Zanzibar, along with other examples of the same species and examples of the Vulturine Guinea-fowl (*Numida vulturina*) and of the Mitred Guinea-fowl (*Numida mitrata*), and is from some part of the East-African coast.

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A letter was read addressed to the Secretary by Mr. E. L. Layard, F.Z.S., urging the desirability of the adoption by naturalists of a fixed scale of colour in describing animals.

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Mr. Tegetmeier exhibited the head of a Deer (*Cervus dama*) from which the antlers had been sawn off close to the burr. The animal had escaped shortly after this operation, and had been shot subsequently. It was then found that a new pair of antlers had grown, each one taking its origin in a ring surrounding the base of the previous cut antler, which remained attached to the skull. The new antlers were imperfectly developed, very irregular, and unsymmetrical.

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The following letter was read, addressed to the Secretary by Mr. Robert B. White, C.M.Z.S., H.B.M. Acting Consul at Medellin, U. S. of Colombia.

Medellin,  
U. S. of Colombia, S. A.  
August 24th, 1879.

SIR,—I beg to communicate to you the following observations upon the habits of a species of Ant (*Atta cephalotes*), and upon a method of defence against the ravages of this insect.

There are two varieties of this ant recognized by the people here:—a large insect which attacks and carries off indiscriminately all classes of foliage; and an insect one third smaller, which in a similar manner attacks grasses and minor vegetation. The habits of both ants are identical; but the large kind is that which causes most injury to plantations.

Having observed that no vegetation comes amiss to this ant, that,

whether bitter, sweet, pungent, caustic, tender or tough, every thing is attacked by it, I was led to remark carefully the use to which the ant puts the enormous quantity of foliage which it carries to its nest. After watching the various foraging parties narrowly, I saw that some of them were engaged in carrying food, principally fruits or portions of fruit, sweet buds and blossoms, maize, rice, etc. Others, again, carry only portions of leaves, showing no selection in the quality, as also bits of straw, stick, and similar things. I then further remarked that the ants only employ this vegetable matter to make beds, upon which the eggs are deposited and hatched by the heat produced by the fermentation of the mass of leaves. The ants do not eat these portions of leaf; and the larvæ are fed upon selected food. When a brood has been hatched, the ants clean up their nest and carry out all the decomposed vegetable matter from the egg-beds. This they do periodically; and the half-rotten fragments of leaves may always be distinguished from the pellets of earth &c. which the ants ordinarily bring out of their excavations. This hotbed matter is also always thrown out in heaps apart, and in large ant-hills often amounts to ten bushels and upwards.

The only efficacious remedy which the farmer has hitherto used against these enemies is the extermination of the ant-colony, which is effected by digging out the nest, flooding it with water or poisoning its inmates with sulphur or acid. But it is often impossible to put this plan in practice—where a clearing or plantation is surrounded by forests or uncultivated ground, in which hundreds and thousands of ant-hills are to be found. I have tried, as many people before me, all sorts of schemes, including the use of all the abominable-smelling and tasting compounds which can be used without killing the plants which one wishes to protect, and have found all inefficacious.

But it seems that the real remedy is near at hand; and it was shown to me by a negro.

When a plantation or garden is attacked, all one has to do is to procure a bushel or so of the decayed leaf beds thrown out of an ant-hill entirely unconnected with that from which the invading ants proceed, and scatter this matter on the ant-roads and about the plantation.

The effect is miraculous. A panic siezes the ants. They drop their burdens instantly; the word is passed along the roads; and empty-handed the whole army hurries off to the nest. They will not return to the same plantation for many weeks; and even then they avoid all spots in which traces of this (to them) offensive matter may remain. The smallest dose suffices; and a bushel of rotten bedding will defend acres of ground. But care must be taken, as remarked, to procure this matter from a distinct ant-hill. If it be from the same nest, the ants take no notice of it.

I have seen this plan tried repeatedly during the last few months, and it has never failed. The biggest army of ants, engineers, pioneers, directors-general and all, is utterly discomfited by this simple means of defence. What the ants see in it I cannot say; but I fancy that they imagine themselves to be in danger of being

attacked by another set of ants, and hurry off to protect their nest. By repeatedly applying the same matter to a nest, the ants at last become so annoyed that they emigrate, carrying their females and eggs to a distance and forming a new colony.

This plan is not generally known, even here in the State of Antioquia; and I have thought that our colonists might profitably be made acquainted with it. By its use we may ward off an unexpected attack by the invader until an opportunity offers of exterminating the brood; and when this cannot be done, it may constitute the only means of defence for crops.

The vegetable matter spoken of is naturally an excellent manure, as I have observed in the case of rose-bushes which I have protected by its use.

Should you consider the above observations to be useful, I trust that you will be so good as to make them known to the Society.

I am, Sir,

Your obedient servant,

ROBERT B. WHITE.

The following papers were read:—

1. Notes on some Species of Chiroptera from Zanzibar, with Descriptions of new and rare Species. By G. E. DOBSON, M.A.

[Received October 6, 1879.]

To the kindness of Dr. Robb, H.M. Indian Army, I owe the material which has furnished the following notes. Seven species are represented in the collections; and all the specimens are well preserved in alcohol.

#### 1. EPOMOPHORUS MINOR, n. sp.

With the exception of *Ep. pusillus*, this is the smallest species of *Epomophorus* yet discovered. In the form of the palate-ridges it certainly very closely resembles *E. macrocephalus*, the ridges being similarly shaped, the fifth ridge<sup>1</sup> having, in most specimens, the same peculiar lozenge-shaped depression in the centre, hitherto considered by me to be characteristic of that species. The head, however, is of very different proportions, being comparatively much smaller; and there is less difference between the males and females in the length of the muzzle; the width of the palate is also greater in proportion to its length.

Tail rudimentary, but distinct, about quarter of an inch in length.

Fur greyish-brown, with a slightly yellowish tinge both above and beneath; paler beneath, but no white patch on the abdomen of

<sup>1</sup> See Catal. Chiropt. Brit. Mus. 1873, pl. ii. fig. 2.

either males or females. The usual white tuft at the base of the ears is distinct; and, in males, the long hairs lining the shoulder-pouches project conspicuously.

The following Table exhibits the measurements of two adult specimens, a male and a female with *fetus in utero*; also, for comparison, the measurements of an adult male and female of *E. macrocephalus*:—

	<i>E. minor.</i>		<i>E. macrocephalus.</i>	
	ad. ♂	ad. ♀	ad. ♂	ad. ♀
Length, head and body.....	4.0	4.1	6.3	5.0
„ head.....	1.65	1.55	2.6	2.3
„ eye from tip of nostril..	0.65	0.55	1.2	1.0
„ ear .....	0.72	0.7	0.9	0.9
„ forearm .....	2.5	2.4	3.5	3.3
„ third finger, metacarpal	1.7	1.65	2.5	5.7
„ „ „ 1st ph. ..	1.1	1.1	1.5	
„ „ „ 2nd ph. ..	1.65	1.65	2.0	
„ fifth finger, metacarpal	1.55	1.5	2.25	4.3
„ „ „ 1st ph. ....	0.8	0.8	1.0	
„ „ „ 2nd ph. ..	0.8	0.8	1.1	
„ tibia .....	0.96	0.9	1.3	1.25
„ foot .....	0.6	0.6	0.85	0.85

## 2. EPOMOPHORUS LABIATUS.

*Pteropus labiatus*, Temminck, Monogr. Mammal. ii. p. 83, pl. 39.

*Epomophorus labiatus*, Dobson, Catal. Chiropt. Brit. Mus. p. 11.

Two specimens in the collection are referable to this species, hitherto known only from dried and badly preserved skins. The type in the Leyden Museum consists of a skin of an immature male individual; but there is another skin in the same collection similarly labelled, which evidently belongs to a full-grown female of the same species, and with this the specimens from Zanzibar very closely agree in measurements, as may be seen from the table below. I have therefore referred them to *E. labiatus*, which, however, as I have already surmised<sup>1</sup>, may turn out to be (when a sufficient number of specimens are available for examination) a local variety only of *E. gambianus*.

The palate-ridges closely resemble those of *E. gambianus* (see *op. cit.* pl. ii. fig. 3a); but the fifth ridge is marked by a slight groove only.

Fur above yellowish brown, with ashy extremities; beneath much paler; on the interfemoral membrane and legs extending much less densely than in *E. gambianus*; a very few hairs only appear on the backs of the feet. In the females there are distinct, though rudimentary, shoulder-pouches.

The following Table exhibits the measurements of an adult female of this species with well-worn teeth, and of an adult female of

<sup>1</sup> *Op. cit.* p. 12.



*E. gambianus*; and it may be seen that considerable differences exist:—

	<i>E. labiatus.</i>	<i>E. gambianus.</i>
Length, head and body .....	5.0	5.5
„ head .....	1.95	2.0
„ eye from tip of nostril .....	0.8	0.7
„ ear .....	0.8	0.85
„ forearm .....	2.85	3.3
„ thumb .....	1.2	1.4
„ third finger, metacarpal .....	1.95	2.25
„ „ „ 1st ph. ....	1.3	1.5
„ „ „ 2nd ph. ....	2.0	2.25
„ fifth finger, metacarpal .....	1.9	2.15
„ „ „ 1st ph. ....	0.9	1.2
„ „ „ 2nd ph. ....	0.95	1.15
„ tibia .....	1.15	1.2
„ foot .....	0.75	0.7

### 3. *TRIENOPS PERSICUS*, var. *AFER*.

*Trienops persicus*, Dobson, J. A. S. B. 1871, p. 455, pl. xxviii.; id. Catal. Chiropt. Brit. Mus. (1878), p. 124, pl. viii. fig. 1.

*Trienops afer*, Peters, Monatsb. Akad. Berl. 1876, p. 913.

After a most careful comparison of the specimens in the collection (which must be referred to the same species as that indicated by Prof. Peters under the name of *T. afer*) with others of *T. persicus* from Shiraz, I am unable to find any differences of importance. I find that the characters enumerated as distinctive of *T. afer*, such as the form of the emarginations on the inner side of the ear-conch and the shape of the central lanceolate process of the nose-leaf, are variable to the extent described in the different specimens, while the darker colour of the fur observable in the African form is probably the normal shade in this species, the type specimens from Persia having fur of a paler colour in conformity with that of other species of animals inhabiting the sandy districts about Shiraz<sup>1</sup>.

The following Table shows how very closely the measurements of the Zanzibar specimens agree with those of one of the specimens from Persia, from among which the type of this species was taken:—

	Shiraz.	Zanzibar.
Length, head and body .....	2.3	2.4
„ tail .....	1.2	1.2
„ ear .....	0.45	0.4
„ forearm .....	2.0	2.0
„ third finger, metacarpal .....	1.6	1.45
„ „ „ 1st ph. ....	0.5	0.55
„ „ „ 2nd ph. ....	0.7	0.65
„ fourth finger, metacarpal .....	1.45	1.35
„ „ „ 1st ph. ....	0.4	0.45
„ „ „ 2nd ph. ....	0.35	0.35

<sup>1</sup> See note on the colour of the fur in *Vesperugo pipistrellus* and other species, in Catal. Chiropt. Brit. Mus. p. 225.

	Shiraz.	Zanzibar.
Length, fifth finger, metacarpal . . . . .	1.1	1.05
„ „ „ 1st ph. . . . .	0.55	0.55
„ „ „ 2nd ph. . . . .	0.4	0.4
„ tibia . . . . .	0.65	0.6
„ foot . . . . .	0.35	0.35

#### 4. RHINOLOPHUS ÆTHIOPS.

*Rhinolophus æthiops*, Peters, Monatsb. Akad. Berl. 1868, p. 637 ; Dobson, Catal. Chiropt. Brit. Mus. p. 122, pl. vii. fig. 12.

Specimens not differing in any respect from the type.

#### 5. NYCTERIS HISPIDA.

*Vespertilio hispidus*, Schreber, Säugeth. i. p. 169 (1775).

*Nycteris hispida*, Dobson, Catal. Chiropt. Brit. Mus. p. 162, pl. xi. fig. 1 (teeth).

An adult female, agreeing with typical examples in the form and relative development of the teeth, in the colour of the fur, and in the shape of the tragus, but differing in the longer ears and slightly greater size throughout.

#### 6. NYCTERIS GRANDIS.

*Nycteris grandis*, Peters, Monatsb. Akad. Berl. 1865, p. 358 ; Dobson, Catal. Chiropt. Brit. Mus. p. 164.

Two perfectly adult specimens of this species, which, by their much greater size, show that the type in the Leyden Museum, and the larger specimen in the British Museum, are both examples of immature individuals. In these specimens, owing evidently to the growth of the adjoining teeth, the small second premolar is much smaller proportionally, and is crushed in between the first premolar and the first molar.

The following are the measurements of one of these specimens, an adult male:—

Length, head and body 3" ; tail 3" ; head 1"·15 ; ear 1"·35, tragus 0"·3 × 0"·1 ; forearm 2"·5 ; thumb 0"·65 ; third finger—metacarp. 1"·8, 1st ph. 1"·2, 2nd ph. 1"·5 ; fifth finger—metacarp. 2"·2, 1st ph. 0·7, 2nd ph. 0"·65 ; tibia 1"·2 ; calcaneum 1"·0 ; foot 0"·55.

#### 7. NYCTERIS ÆTHIOPICA.

*Nycteris æthiopica*, Dobson, Catal. Chiropt. Brit. Mus. p. 165, pl. xi. fig. 3 (tragus).

The collection includes the first obtained specimens of this species, preserved in alcohol. These show how difficult it is to correctly describe species from dried skins ; for the tragus, instead of being narrower than in *N. javanica*, as originally stated by me, is really broader and altogether larger. The drawing of the tragus (referred to above) which accompanies my description, however, is quite correct. The specimens agree very closely in size ; and the following are the measurements of the largest :—

Length, head and body 2"·35 ; tail 2"·25 ; head 0"·9 ; ear 1"·15,

tragus  $0''\cdot3 \times 0''\cdot15$ ; forearm  $1''\cdot95$ ; thumb  $0''\cdot55$ ; third finger—metacarp.  $1''\cdot4$ , 1st ph.  $1''\cdot0$ , 2nd ph.  $1''\cdot2$ ; fifth finger—metacarp.  $1''\cdot65$ , 1st ph.  $0''\cdot55$ , 2nd ph.  $0''\cdot55$ ; tibia  $0''\cdot95$ ; calcaneum  $0''\cdot7$ ; foot  $0''\cdot45$ .

## 2. Notice sur quelques Coquilles du Pérou.

Par le PRINCE LADISLAS LUBOMIRSKI.

[Received October 7, 1879.]

(Plates LV. & LVI.)

Les deux naturalistes polonais, MM. Jelski et Stolzmann, qui ont fait l'exploration du Haut-Pérou, l'un depuis 1870 jusqu'à 1874, l'autre depuis 1875 jusqu'à 1878, ont envoyé de riches collections au Musée de Varsovie; entre autres objets zoologiques, ils nous ont procuré de ces contrées différentes espèces de coquilles terrestres, les unes déjà connues, d'autres encore inédites, que je me propose de publier dans ces notices. La description détaillée des localités qu'ils ont parcourues, a été déjà mainte fois consignée dans les Listes des Oiseaux du Pérou, par le Conservateur du Musée de Varsovie, M. Taczanowski, et publiée dans les 'Proceedings' de la Société.

### 1. SUCCINEA PERUVIANA, Phil.

*Succinea peruviana*, Phil., Monogr. Helic. viv. Pfr. t. v. p. 38.

Lima, envoyée par M. Jelski en 1871.

### 2. HELIX (AMMONOCERAS) TROCHILIONEIDES, D'Orb.

*Helix (Ammonoceras) trochilioneides*, D'Orb., Monogr. Helic. viv. Pfr. t. i. p. 113.

Lima, envoyée par M. Jelski en 1871.

### 3. HELIX (POLITA) SANTANAËNSIS, Pfr.

*Helix (Polita) santanaënsis*, Pfr., Monogr. Helic. viv. Pfr. t. iv. p. 82.

Tambillo, envoyée par M. Stolzmann en 1878.

### 4. HELIX (SYSTROPHIA) PSEUDO-PLANORBIS, n. sp. (Plate LV. figs. 1, 2, 3.)

*Species Helici gyrellæ*, Mor., *affinis*. Testa latissime umbilicata, planorboidea, oblique confertim striata, albida, epidermide lutescente oblecta; spira fere plana, sutura profunda; anfr. 6-7, ultimus vix depressus, non descendens; apert. diagonalis sub-oblique rotundata; perist. simplex, margine columellari regulariter arcuato.

Diam. maj.  $16\frac{1}{2}$ , min. 8, alt. 3 mill.

Pujupé, entre Hualguayoc et Chota, à 10,000 pieds d'altitude, trouvée sous un tronc d'arbre mort, envoyée par M. Stolzmann au nombre d'une cinquantaine d'exemplaires en 1878.

Diffère de l'*Helix gyrella*, Mor., par sa dimension, par sa contexture plus ferme, par sa couleur, qui est blanchâtre, et par son épiderme jaunâtre qui le recouvre, par sa spire, qui est tant soit peu bombée, et par le nombre des tours.

Diffère de l'*Helix tortilis*, Mor., par sa dimension, par ses stries, qui dans le nôtre sont réparties régulièrement sur tous les tours, par sa hauteur et par le manque du sinus au bord supérieur de l'ouverture.

5. *HELIX* (LYSINOË) *ALSOPHILA*, Phil.

*Helix* (*Lysinoë*) *alsophila*, Phil., Monogr. Helic. viv. Pfr. t. v. p. 303.

Chota, envoyée par M. Stolzmann en 1878.

6. *HELIX* (ISOMERIA) *STOLZMANNI*, n. sp. (Plate LV. figs. 4, 5, 6.)

*Testa semiobtecta, umbilicata, depressa, solida, striata, striis obliquis minutissime granulatis; saturate castanea; spira convexiuscula, vix elevata; anfractus regulariter accrescentes, ultimus carinatus, antice deflexus, basi versus aperturam inflatus; apert. perobliqua, parva, securiformis; perist. purpurco-fulvescens, incrassatum, reflexum, ad carinam angulatum, marginibus callo albo funiculato junctis, dente unico coniformi infra carinam posito.*

Diam. maj. 40, min. 33, alt. 17 mill.

Montaña de Palto, près de Tambillo, district de Chota, trouvées par M. Stolzmann au mois de Mai 1877, un exemplaire vivant, ayant toutes ses couleurs, et 4 exemplaires morts.

Coquille ombiliquée, à moitié ouverte, déprimée, solide, marquée de stries obliques et granuleuses, granulations punctiformes, petites, parsemées par groupes. Sur la partie basale du dernier tour les granulations sont isolées et presque invisibles à l'œil nu; couleur marron; spire peu élevée; tours de spire au nombre de 5, très-peu convexes, le dernier muni d'une carène et brièvement descendant, enflé en dessous et comprimé vers la bouche. Bouche oblique, petite, trapézoïdiforme. Peristome épaissi, couleur pourpre-fauve, un peu canaliculé sur le bord droit, à bords joints par une couche de callus blanc, les bords supérieur et inférieur légèrement étalés et renversés, le columellaire oblique et arrondi. Une dent coniforme au-dessous de la carène.

Je dédie cette espèce à l'infatigable explorateur du Pérou, M. Stolzmann, qui a enrichi le Musée de Varsovie d'un grand nombre d'objets concernant toutes les branches d'histoire naturelle.

7. *BULIMUS* (BORUS) *POPELAIRIANUS*, Nyst.

*Bulimus* (*Borus*) *popelairianus*, Nyst, Monogr. Helic. viv. Pfr. t. ii. p. 20; Martens in Pfr. Novit. Conch. t. v. p. 3.

Palma, envoyé par M. Stolzmann en une dizaine d'exemplaires, avec deux œufs de la grandeur d'un œuf de Colombe, fourni aussi en 1870 par M. Jelski en deux exemplaires de Montérice.

8. *BULIMUS (BORUS) SANCTÆ-CRUCIS*, d'Orb.

*Bulimus (Borus) sanctæ-crucis*, d'Orb., Monogr. Helic. viv. Pfr. t. ii. p. 23; Mart. in Pfr. Novit. Conch. t. v. p. 6.

Amable Maria, envoyé par M. Jelski en 1871.

9. *BULIMUS (BORUS) LICHTENSTEINI*, Alb.

*Bulimus (Borus) lichtensteini*, Alb., Monogr. Helic. viv. Pfr. t. iv. p. 366; Mart. in Pfr. Novit. Conch. t. v. p. 20.

Guajango, envoyé par M. Stolzmann en 1878.

10. *BULIMUS (BORUS) MORITZIANUS*, Pfr.

*Bulimus (Borus) moritzianus*, Pfr., Monogr. Helic. viv. Pfr. t. ii. p. 23.

Punamarca, envoyé par M. Jelski en 1872.

11. *BULIMUS (DRYPTUS) SANGOÆ*, Tschudi.

*Bulimus (Dryptus) sangoæ*, Tschudi, Monogr. Helic. viv. Pfr. t. iii. p. 317.

Amable Maria, envoyé par M. Jelski en 1872, en 2 exemplaires.

12. *BULIMUS (PORPHYROBAPHE) IOSTOMUS*, Sow.

*Bulimus (Porphyrobaphe) iostomus*, Sow., Monogr. Helic. viv. Pfr. t. ii. p. 29.

Lechugal, près de Tumbes, envoyé par M. Stolzmann en une trentaine d'exemplaires.

13. *BULIMUS (PORPHYROBAPHE) WRZESNIEWSKII*, n. sp. (Plate LV. figs. 7, 8.)

*Testa imperforata, ovato-elongata, solida, nitida, longitudinaliter striata et minutissime decussata, carneo-fulvescens, strigis longitudinalibus fuscis punctisque sordide liliaceis ornata; spira conica, obtusa; anfractibus convexiusculis, ultimus spiram æquans, basi attenuatus; columella callosa plicato-torta; apert. auriformis, basi angulata, intus alba; perist. album, crassum et expansum, marginibus callo nitidissimo albo junctis, columellari plicato adnato.*

Long. 78, diam. 37 mill. Apert. cum perist. 42 mill. longa, intus 16 mill. lata, perist. 4 mill. latum.

Tambillo, envoyé par Mr. Stolzmann en 1878, en un seul exemplaire.

Coquille imperforée, solide, de forme ovoïde-allongée, luisante, spire conique à sommet obtus. Tours de spire au nombre de six, peu convexes, les deux premiers tours, de couleur carnée, sont régulièrement granulés, et les deux suivants, fauves, ont des stries distantes et très-marquées, et les deux derniers sont superficiellement striés et croisés par d'autres stries presque invisibles à l'œil nu; la couleur de la coquille a, en général, une teinte carnée, le dernier tour seulement est jaune-verdâtre. Les quatre derniers tours sont marqués longitudinalement de flammes brunes et de ponctuations lilas sales.

Columelle blanche, calleuse, munie d'un pli et tordue. Ouverture inclinée vers l'axe, anguleuse à sa base, blanche à l'intérieur, en forme d'oreille. Peristome blanc, luisant, épaissi et étalé, à bords joints par un callus se continuant à l'intérieur, bord columellaire à pli, affixe.

Je dédie ce *Bulinus* à M. Wrzesniowski, professeur de Zoologie de l'Université de Varsovie, qui par sa science, ses travaux sur les infimement petits, et par ses découvertes de nouveaux Crustacées, notamment de l'ordre des Amphipodes, s'est acquis une réputation dans la science. À son obligeance je dois aussi les dessins des coquilles que je joins à ces notes.

14. *BULIMUS* (ORPHNUS) *FOVEOLATUS*, Reeve.

*Bulinus* (*Orphnus*) *foveolatus*, Reeve, Proc. Zool. Soc. 1849, p. 97 ; Monog. Helic. viv. Pfr. t. ii. p. 24.

Amable Maria, envoyé par M. Jelski en 1871.

15. *BULIMUS* (ORPHNUS) *BIFASCIATUS*, Phil.

*Bulinus* (*Orphnus*) *bifasciatus*, Phil., Monogr. Helic. viv. Pfr. t. ii. p. 199.

Junin, envoyé par M. Jelski en une dizaine d'exemplaires en 1872.

16. *BULIMUS* (ORPHNUS) *BREPHOIDES*, d'Orb.

*Bulinus* (*Orphnus*) *brephoides*, d'Orb., Monogr. Helic. viv. Pfr. t. ii. p. 143.

Amable Maria, envoyé par M. Jelski en 1872.

17. *BULIMUS* (ORPHNUS) *PORPHYREUS*, Pfr.

*Bulinus* (*Orphnus*) *porphyreus*, Pfr., Monogr. Helic. viv. Pfr. t. ii. p. 199.

Chota, envoyé par M. Stolzmann en une vingtaine d'exemplaires en 1877, assez commun dans cette localité.

18. *BULIMUS* (ORPHNUS) *TSEJNI*, Phil.

*Bulinus* (*Orphnus*) *tserni*, Phil., Monogr. Helic. viv. Pfr. t. vi. p. 121.

Amable Maria, envoyé par M. Jelski en deux exemplaires en 1872.

19. *BULIMUS* (ORPHNUS) *JELSKII*, n. sp. (Plate LVI. figs. 1, 2.)

*Testa subperforata, elongato-ovata, apice obtusa, striata, translucens, saturate fulva, quadrifasciata, fasciis brunneis, superior et basalis latae, mediana et suturalis angustissimae; sutura irregulariter crenulato-plicata; anfractibus 6, convexiusculis, ultimo spiram subaequante; columella vix plicata, subtorcia; apert. ovalis, oblonga, intus albescens; perist. simplex, marginibus callo tenuissime junctis, dextro recto, columellari dilatato rimam formante, livido.*

Long. 35, diam. 15 mill. Apert. 17 mill. longa, 8 lata.

Amable Maria, près de Tarma, envoyé en 1873 par M. Jelski, en un seul exemplaire.

La coquille de ce *Bulime* est presque close, de forme ovale-oblongue, transparente, assez solide, striée irrégulièrement, de couleur jaune-olivâtre, munie de 4 bandes brunes, dont deux plus étroites et deux plus larges. Sa spire est conique, à tours convexes et à sommet obtus; la suture est crénelée et munie de plis courts. Tours de spire au nombre de six, le dernier égalant presque la spire. La columelle ayant un pli obsolète est légèrement tordue. Ouverture ovale-oblongue, couverte à l'intérieur d'une légère couche de callus blanc, laissant apercevoir par transparence les bandes brunes. Peristome simple, émoussé; les bords sont joints par un callus très-mince, le bord columellaire, de couleur livide, est un peu élargi, couvrant la perforation.

Je dédie ce *Bulime* au savant explorateur M. Jelski, qui dans les localités qu'il a visitées, l'île de Madère, la Guyane, la Martinique, et enfin le Pérou, a laissé des traces ineffaçables de son activité et de l'attachement à sa patrie, qu'il a enrichi de ses collections, recueillies avec tant de peines et de discernement.

20. *BULIMUS (GONIOSTOMA) CHANCHAMAYENSIS*, Hidalg.

*Bulimus (Goniostoma) chanchamayensis*, Hidalg., Monogr. Helic. viv. Pfr. t. viii. p. 111.

Tarma, envoyé par M. Jelski en 1872, en trois exemplaires.

21. *BULIMUS (DRYMÆUS) INTERPICTUS*, Mart.

*Bulimus (Drymæus) interpiectus*, Mart., Monogr. Helic. viv. Pfr. t. vi. p. 21.

Junin, envoyé par M. Jelski en deux exemplaires en 1872.

22. *BULIMUS (DRYMÆUS) ALTO-PERUVIANUS*, Reeve.

*Bulimus (Drymæus) alto-peruvianus*, Reeve, Monogr. Helic. viv. Pfr. t. iii. p. 366.

Tambillo, envoyé par M. Stolzmann en 1878, en une dizaine d'exemplaires.

23. *BULIMUS (DRYMÆUS) CANTATUS*, Reeve.

*Bulimus (Drymæus) cantatus*, Reeve, Monogr. Helic. viv. Pfr. t. iii. p. 373.

Tarma, un seul exemplaire fourni par M. Jelski en 1872.

24. *BULIMUS (DRYMÆUS) ORTHOSTOMA*, E. A. Smith.

*Bulimus (Drymæus) orthostoma*, E. A. Smith, Proc. Zool. Soc. 1877, p. 364.

Tambillo, envoyé par M. Stolzmann en 1878, en huit exemplaires.

25. *BULIMUS (SCUTALUS) NIGROPILEATUS*, Reeve.

*Bulimus (Scutalus) nigropileatus*, Reeve, Monogr. Helic. viv. Pfr. t. iii. p. 427.

Chota, envoyé par M. Stolzmann en 1878, en une dizaine d'exemplaires.

## 26. BULIMUS (SCUTALUS) PROTEUS, Brod.

*Bulimus (Scutalus) proteus*, Brod., Monogr. Helic. viv. Pfr. t. ii. p. 61.

*Bulimus sordidus* (Desh.), Reeve.

Tarma, envoyé par M. Jelski en 1872, et par M. Stolzmann de Chota en 1878, en grand nombre et beaucoup de variétés.

## 27. BULIMUS (SCUTALUS) ALUTACEUS, Reeve.

*Bulimus (Scutalus) alutaceus*, Reeve, Monogr. Helic. viv. Pfr. t. iii. p. 324.

Amable Maria, envoyé par M. Jelski en 1872, environ vingt exemplaires.

## 28. BULIMUS (SCUTALUS) BADIUS, Sow.

*Bulimus (Scutalus) badius*, Sow., Monogr. Helic. viv. Pfr. t. ii. p. 189.

Tarma, envoyé par M. Jelski en 1872, une dizaine d'exemplaires environ.

## 29. BULIMUS (SCUTALUS) VERSICOLOR, Brod.

*Bulimus (Scutalus) versicolor*, Brod., Monogr. Helic. viv. Pfr. t. ii. p. 61.

Truxillo, procuré par M. Jelski en 1871, en beaucoup d'exemplaires.

## 30. BULIMUS (THAUMASTUS) CHRYSOMELAS, Mart.

*Bulimus (Thaumastus) chrysomelas*, Mart., Monogr. Helic. viv. Pfr. t. vi. p. 133.

Tunin, envoyé par M. Jelski en trois exemplaires en 1872.

## 31. BULIMUS (OBELISCUS) HAPLOSTYLUS, Pfr.

*Bulimus (Obeliscus) haplostylus*, Pfr., Monogr. Helic. viv. Pfr. t. ii. p. 152.

Tambillo, trouvés sous les feuilles par M. Stolzmann, en grand nombre, et envoyé en 1878.

## 32. BULIMUS (PLECTOSTYLUS) KOCHII, Pfr.

*Bulimus (Plectostylus) kochii*, Pfr., Monogr. Helic. viv. Pfr. t. ii. p. 148.

Amable Maria, envoyé en 1872 par M. Jelski, en trois exemplaires.

## 33. BULIMUS (MESEMBRINUS) TRUJILLENSIS, Phil.

*Bulimus (Mesembrinus) trujillensis*, Phil., Monogr. Helic. viv. Pfr. t. vi. p. 129.

Trujillo, envoyé par M. Stolzmann en 1877, environ une dizaine d'exemplaires.



34. *BULIMUS* (*MESEMBRINUS*) *SACHSEI*, Alb.

*Bulinus* (*Mesembrinus*) *sachsei*, Alb., Monog. Helic. viv. Pfr. t. iv. p. 484.

Tambillo, envoyé par M. Stolzmann en 1878. Dix exemplaires environ.

35. *BULIMUS* (*MESEMBRINUS*) *PÆCILUS*, d'Orb. (?)

*Bulinus* (*Mesembrinus*) *pæcilus*, d'Orb., Monog. Helic. viv. Pfr. t. ii. p. 200.

La description de M. d'Orbigny semble s'accorder avec l'espèce envoyée par M. Stolzmann ; mais elle diffère dans quelques traits particuliers aux 25 exemplaires que je possède ; par le sommet de la coquille, qui n'est aucunement noir, la disposition des bandes est autre et le nombre de celles-ci est moindre, n'arrivant jamais à 7 ou 8, et par le péristome qui est simple.

Le sommet et la coloration des bandes présentent les différences suivantes :

1. Var. sommet rose, à 6 bandes noires bordées d'orange, 1 exemplaire.

2. Var. sommet jaunâtre, à 6 bandes interrompues noires, 7 exemplaires.

3. Var. sommet corné à 3 bandes jaune-paille dans la partie supérieure de la coquille, et 3 bandes noires dans la partie basale.

4. Var. sommet blanchâtre à 3 bandes noires autour de la perforation.

5. Var. sommet doré à 3 bandes noires autour de la perforation, la coquille étant jaune.

6. Var. sommet rose, coquille blanchâtre, à une bande étroite blanche au milieu du dernier tour, celui-ci étant ornée de flamme longitudinale jaune-paille.

Chota, envoyé par M. Stolzmann en 1878.

36. *BULIMUS* (*LEPTOMERUS*) *MOLECILLUS*, Reeve.

*Bulinus* (*Leptomerus*) *molecillus*, Reeve, Monogr. Helic. viv. Pfr. t. iii. p. 183.

Tarma, envoyé par M. Jelski en 1872.

37. *PERIDERIS* *FLAMMIGERA*, Ferr.

*Perideris flammigera*, Ferr., Monogr. Helic. viv. Pfr. t. ii. p. 245.

Chota, envoyée par M. Stolzmann en une trentaine d'exemplaires, en 1878.

38. *PUPA* *PAREDESII*, d'Orbigny.

*Pupa paredesii*, d'Orbigny, Monogr. Helic. viv. Pfr. t. ii. p. 309.

Chorillos, trouvée par M. Stolzmann en 1877, sous les pierres.

39. *CLAUSILIA* *PERUANA*, Tschudi.

*Clausilia peruana*, Tschudi, Monogr. Helic. viv. Pfr. t. ii. p. 483.

Mes trois exemplaires, quoique décollés, diffèrent de la descrip-

tion faite par M. Troschel dans le 'Zeitschrift für Malacologie,' 1841, p. 51, en ce que deux de ceux-ci ont 9 tours de spire, et 1 seul est de 7 tours.

Tarma, envoyée par M. Jelski en 1872.

40. *CLAUSILIA TACZANOWSKII*, n. sp. (Plate LVI. figs. 3, 4.)

*Testa non rimata, cylindracea, ventricosiuscula, decollata, fuliginosa, striata et costata, costis lamelliformibus distantioribus albidis undulatis et interdum irregulariter sculptis; anfr. 6-8 parum convexi, ultimus paulo angustior, fere angulatus; apert. subquadrato-ovata, fusca. Lamella supera marginalis, flexuosa; infera profundior, obliqua; subcolumellaris arcuata, subemersa; lunella valida; plica palatali unica. Perist. incrassatum, undique liberum, reflexum, fulvescens. Clausilium ovato-elongatum, apice acuminatum.*

Long. 22-25 $\frac{1}{2}$  diam. 6 mill. Apert. 6 mill. longa, 4 $\frac{1}{2}$  lata.

Bambamarca, recueillies par M. Stolzmann, le 2 mars 1878.

Coquille non rimée, cylindrique, tant soit peu ventrue, décollée, grise, munie de stries assez élevées, particulièrement vers la suture, et de côtes lamelliformes, distantes, anguleuses, ressemblant à des lettres hébraïques, de couleur blanchâtre; tours de spire 6-8 peu convexes, le dernier tour un peu comprimé et presque anguleux à sa base. Ouverture presque carrée, un peu plus étroite vers le bas, de couleur brune. Lamelle supérieure flexueuse, atteignant le bord, l'inférieure oblique, plus profonde, lamelle columellaire arquée; lunelle forte; pli palatale allongé. Péristome réfléchi, sale.

Je dédie cette nouvelle Clausilie à Mons. Ladislas Taczanowski, ornithologiste et arachnéologue d'un grand mérite, comme hommage de mon amitié et comme preuve de ma reconnaissance à l'homme, qui a bien voulu me guider de ses conseils dans mes travaux conchyliologiques.

41. *CLAUSILIA SLOSARSKII*, n. sp. (Plate LVI. figs. 5, 6, 7.)

*Testa non rimata, cylindracco-fusiformis, decollata, violaceo-brunnea, sericea, subtiliter et undulatum striata; anfr. 6-7, ultimus breviter solutus; cervix rotundata; apert. rotundato-ovata, fuscescens; lamella supera marginalis, elevata; infera obliqua; spiralis flexuosa, et subcolumellaris continua; lunella subarcuata; plica palatalis unica, elongata; perist. undique liberum, late reflexum, sordidum. Clausilium ovato-oblongum.*

Long. 22-26, diam. 5-5 $\frac{1}{2}$  mill. Apert. 5-5 $\frac{1}{2}$  mill. longa, 5 lata.

Pumamarca, recueillies par M. Stolzmann en 1878.

Coquille non rimée, fusiforme, décollée, de couleur brune-violacée, soyeuse, finement striée; les stries sont longitudinalement ondulées, les stries transversales sont distantes et obsolètes, se laissant apercevoir sur les premiers tours de quelques exemplaires. Tours de spire au nombre de 6-7, le dernier détaché en avant et arrondi à sa base. Lamelle supérieure élevée; l'inférieure oblique; lamelle spirale flexueuse, et la columellaire non interrompue. Lunelle distincte, peu

arquée. Pli palatal unique allongé. Péristome réfléchi, de couleur blanc-sale.

Je dédie cette Clausilie à l'adjoint de la chaire d'anatomie comparée, Mons. Antoine Slósarski, qui s'est occupé particulièrement de la faune conchyliologique du Royaume de Pologne, et qui par ses travaux anatomiques sur les Mollusques s'est acquis une réputation dans le pays.

42. *CLAUSILIA FILOCOSTULATA*, n. sp. (Plate LVI. figs. 8, 9, 10, 11.)

*Testa non rimata, cylindraceo-turrita, decollata, fulvescens, tenuis, translucens, irregulariter capillaceo-lamellosa; anfr. 8, convexiusculi, ultimus solutus, breviter descendens, supra aperturam sulcatus; cervix vix rotundata; lamella supera marginalis compressa, infera vix elevata, subcolumellaris immersa; lunella brevis, arcuata; plica palatalis unica, distincta. Perist. albidum, continuum, subexpansum. Clausilium ovato-lanceolatum.*

Long. 17, diam. 4 mill. Apert. 3 mill. longa, 2 lata.

Dans la localité, nommée Escalon, entre Tunin et Obrajillo, trouvées par M. Jelski, en 1872 au mois de novembre, dans les roches calcaires.

Coquille non rimée, cylindrique et turriculée, grêle, un peu transparente, jaunâtre, munie de lamelles filiformes, les unes en groupes, les autres distantes, plus pâles que le fond; tours de spire au nombre de 8, peu convexes, le dernier arrondi. Ouverture presque carrée, arrondie vers sa base. Lamelle supérieure marginale, comprimée; l'inférieure élevée, la columellaire grêle. Lunelle arquée, courte. Pli palatal unique et distinct. Péristome blanchâtre, continu et brièvement réfléchi.

43. *CLAUSILIA CHACAËNSIS*, n. sp. (Plate LVI. figs. 12, 13, 14, 15.)

*Testa non rimata, fusiformis, solidula, cornea, oblique striatula; anfr. 9, convexi, ultimus breviter solutus, angustior, basi vix compressus, oblique elongatus; apert. trapezoïdeo-ovalis, lateraliter compressa; lamella supera marginalis; infera obliqua, valida, atro-fulva; subcolumellaris immersa; lunella semicircularis, distincta; plica palatalis unica, elongata. Perist. albidum et vix incrassatum. Clausilium pyriforme.*

Long. 14, diam.  $2\frac{1}{2}$  mill. Apert. 4 mill. longa, 2 lata.

Des environs de Chaca, à une heure de distance de Huanta, envoyée par M. Jelski en 1873.

Coquille non rimée, fusiforme, assez solide, striée obliquement, cornée; dans quelques exemplaires on remarque vers la suture des taches plus foncées alternant avec de plus claires; tours de spire 9, convexes, le dernier rétréci, peu prolongé et arrondi à sa base. Ouverture trapézoïdale et allongée. Lamelle supérieure marginale; l'inférieure oblique, plus forte et de couleur brune; la columellaire immergée; lunelle arrondie et distincte; pli palatal allongé. Périst.

stome grisâtre, réfléchi et épaissi. Je donne le nom à cette Clausilie de la localité où cette espèce a été trouvée.

44. *GUESTERIA BRANICKII*, n. sp.

Envoyée par M. Stolzmann en 1878 de Tambillo, dont la description va incessamment paraître dans le 'Bulletin' de la Société Zoologique de France.

EXPLANATION OF THE PLATES.

PLATE LV.

- Figs. 1-3. *Helix (Systrophia) pseudo-planorbis*, p. 719.  
 4-6. — (*Isomera*) *stolzmanni*, p. 720.  
 7, 8. *Bulinus (Porphyrobaphe) wrzesniowski*, p. 721.

PLATE LVI.

- Figs. 1, 2. *Bulinus (Orphnus) jelskii*, p. 722.  
 3, 4. *Clausilia taczanowski*, p. 726.  
 5-7. — *slosarskii*, p. 726.  
 8-11. — *filocostulata*, p. 727.  
 12-15. — *chacaensis*, p. 727.

3. Descriptions of two new Species of *Helix (Eurycratera)* from S.E. Betsileo, Madagascar. By GEORGE FRENCH ANGAS, C.M.Z.S., F.L.S., &c.

[Received October 27, 1879.]

(Plate LVII.)

*HELIX (EURYCRATERA) BETSILEOENSIS*, n. sp. (Plate LVII. figs. 1, 2.)

Shell broadly umbilicated, depressedly ovate, rather solid, somewhat shining, irregularly transversely rugosely striated on the last whorl, the upper whorls finely and distinctly granulated, the last faintly keeled at the periphery, dark-olive brown, spotted here and there with greenish yellow, darker below the keel, with very indistinct indications of bands above it, upper whorls greenish yellow, spire flatly convex, apex depressed; whorls  $3\frac{1}{2}$ , rapidly increasing; base tumid and convex around the wide umbilicus; aperture very oblique, quadrately ovate, interior pearly grey, under the lens very minutely shagreened; peritreme thickened and slightly reflexed, columella a little expanded over the umbilicus, coarsely granulated along the entire inner surface, margins united by a callus.

Diam. maj. 3 poll. 3 lin., min. 2 poll. 6 lin., alt. 1 poll. 6 lin.

*Hab.* S.E. Betsileo, Madagascar.

Larger and more elongated than *H. guesteriana*, Crosse, with a tumid base and a wide umbilicus; this species wants the malleated sculpture so remarkable in *H. guesteriana*, as well as the second dark raised ridge above the periphery. It differs also from *H. cornu-giganteum* in shape, the latter being rounder with a flattened base and a small umbilicus.

HELIX (EURYCRATERA) IBARAOENSIS, n. sp. (Plate LVII. figs. 3, 4.)

Shell imperforate, globosely ovate, moderately solid, shining, transversely irregularly rugosely striated in front and very finely granulated on the upper whorls, the granules descending to the base behind, yellowish olive, encircled with numerous narrow dark brown bands that lose themselves and become darker towards the aperture and base; spire flatly convex, apex depressed; whorls  $3\frac{1}{2}$ , rapidly increasing, the last very large and inflated; aperture oblique, large, roundly ovate, pearly bluish violet within; peristome slightly thickened, the margins united by a thick callus; columella smooth.

Diam. maj. 3 poll. 6 lin., min. 2 poll. 8 lin., alt. 2 poll. 4 lin.

Hab. S.E. Betsileo, Madagascar.

This fine shell somewhat approaches *H. magnifica*, Fér., but is much more globular and compact, with the position of the spire less remote; and it has also a different style of coloration.

Examples of this and the preceding species have lately been received from S.E. Betsileo, Madagascar, by Mr. Edward Bartlett, of Maidstone, who has kindly placed them in my hands for description.

#### EXPLANATION OF PLATE LVII.

Figs. 1, 2. *Helix (Eurycratera) betsileoensis*, p. 728.  
3, 4. — (—) *ibaraensis*, p. 729.

#### 4. On Arachnida from the Mascarene Islands and Madagascar.

By ARTHUR G. BUTLER, F.L.S. &c., Assistant Keeper,  
Zoological Department, British Museum.

[Received November 1, 1879.]

#### (Plate LVIII.)

Last year a small series of Spiders was obtained through Mr. H. H. Slater from Réunion and Mauritius, of which the following is a list.

1. SCYTODES MAJOR, Simon.

Plaine des Palmistes, Réunion.

2. ULOBORUS BORBONICUS, Vinson.

Mauritius.

3. OLIOS LEUCOSIUS, Walckenaer.

Mauritius.

The identification of these three species, however, is a little doubtful, owing to the imperfection of the figures in Vinson's 'Araneïdes des îles de la Réunion' &c.

4. *PHOLCUS BORBONICUS*, Vinson.

Plaine des Palmistes.

Although the specimen is somewhat injured, there is no mistaking this remarkable species.

5. *META*? *SANCTI-BENEDICTI*, Vinson.

There is also a Spider (somewhat damaged) which seems allied to the above, from Mauritius.

6. *NEPHILA LABILLARDIERI*, Thorell?

Plaine des Palmistes.

Although it seems scarcely possible that the species of Réunion can be identical with that from New Caledonia, I have failed to discover any difference by which to distinguish it from Dr. Thorell's figures.

7. *EPEIRA ISABELLA*, Vinson.

Plaine des Palmistes.

8. *EPEIRA SLATERI*, n. sp. (Plate LVIII. figs. 1, 1a, 1b.)

♀. Ferruginous; sides of the cephalothorax blackish; a central irregular longitudinal abdominal band represented by yellow spots and by four blackish depressed spots in the form of a square; falces piceous; labium and maxillæ, pectoral shield, and ventral surface of abdomen testaceous.

Cephalothorax subquadrate in front, almost circular behind the caput, with slightly concave posterior margin, the sutural margins of the caput well defined and terminating in a depression at the second third of the dorsal surface; a central Y-shaped line upon the posterior half of the caput and ending in the same depression; caput hairy, convex; central oculiferous tubercle prominent and X-shaped, the anterior pair of eyes rather further apart than the posterior pair; lateral eyes small, and placed upon little, oblique, less prominent tubercles at the anterior angle on each side; abdomen short, almost cordiform; epigyne linguiform; pectoral shield ovoid, truncated in front; coxæ short, widening towards the culmen; relative length of legs 1, 2, 4, 3. Falces quadridentate on lower margins. Length of cephalothorax and abdomen together 10 millimetres.

Plaine des Palmistes, Réunion.

There is a series of what I take to be a *Holothyrs* near *H. coccinelloides*, but differing from Walckenaer's figures in the number of joints in the antennæ and the absence of the linguiform plate on the under surface of the body.

The following Spiders have been received this year from Madagascar:—

1. *DRASSUS MALAGASSICUS*, n. sp. (Plate LVIII. figs. 3, 3a, 3b.)

♂. Mahogany-red; the cephalothorax with a broad ill-defined blackish longitudinal band on each side; the caput and a stripe on

each side beyond the blackish bands clothed with depressed whitish pile; palpi, excepting the bulbus and under surface of body, horn-yellow; bulbus castaneous, clothed with pale brown hair above, black below; falces castaneous, clothed with pale hair; legs sparsely clothed with pale hair and with black spines; abdomen above brown, densely clothed with short pale greyish-brown hair.

Cephalothorax ovoid, truncated in front, very slightly indented in the middle behind, shelving at the sides, but flattened along the dorsal or central longitudinal region; sutural outline of the caput feebly indicated; margins of cephalothorax behind the caput regularly convex; abdomen oval, flattened or truncated in front, posterior extremity obtusely pointed; pectoral shield oval and indistinctly nine-sided; coxæ barrel-shaped, those of the two anterior pairs of legs with straight anterior and convex posterior margins. Relative length of the legs 1 and 4, 2, 3; relative length of joints as follows:—femoral joints—first pair  $8\frac{1}{2}$  millimetres, second pair 7, third 6, fourth 8; tibial (including basitibial or knee-joint)—first pair 11, second 9, third 7, fourth 11; tarsal joints or tarsus—first  $13\frac{1}{2}$ , second  $11\frac{1}{2}$ , third 9, fourth 14. Falces large, with three conical denticles on the inferior margins, and with a powerful curved movable fang; palpi about 9 millimetres in length, with the bulbus large, pyriform, and incurved. Length of cephalothorax and abdomen together (exclusive of falces) 17 millimetres.

Antananarivo (*Kingdon*).

2. *GASTERACANTHA BORBONICA*, Vinson.

Antananarivo (*Kingdon*).

3. *GASTERACANTHA ACROSOMOIDES*, Cambridge.

Antananarivo (*Kingdon*).

4. *CÆROSTRIS TUBERCULOSA*, Vinson.

Fianarantsoa (*Shaw*).

Unfortunately these specimens were allowed by the collector to get nearly dry and were injured by mould.

5. *CÆROSTRIS MITRALIS*, Vinson.

Antananarivo (*Kingdon*).

One specimen, agreeing well with the figures.

6. *CÆROSTRIS STYGIANA*, n. sp. (Plate LVIII. figs. 4, 4 a, 4 b.)

♀. Cephalothorax black, covered when dry with golden pile, posterior portion castaneous; legs above black, banded at base of tibiae and tarsi with white; coxæ and femora below castaneous; falces black, fringed above with golden hair; maxillæ orange above, dark castaneous, fringed with dull lake-red hair, below; labium and pectoral shield blackish; abdomen above testaceous, below black.

Cephalothorax nearly square, but convex at the sides, almost perpendicular behind the caput; the latter more than twice as wide as long, with six projecting horizontal processes or prominent tubercles,

two on each side and two behind, the anterior lateral processes bifid, owing to their confluence with the lateral oculiferous tubercles; a prominent, nearly circular, central oculiferous tubercle bearing the four central eyes; the anterior pair of eyes larger than the posterior pair, nearer together, but separated from each other by a longer distance than from the posterior pair; abdomen scutiform, the anterior margin truncated; the anterior surface oblique, longitudinally sulcated and with a transverse series of six mammiform tubercles upon the ridges between the sulci; a large humeral process on each side, its length six millimetres, its form cylindrical, expanding laterally towards the culmen, which bears three well-developed and slightly incurved conical projections, the central projection forming the apex of the process and therefore considerably more prominent than the two lateral ones; a short distance behind each process is a small impression followed by a small conical process; lateral margins of the abdomen arched and indistinctly transversely sulcated, posterior extremity obtusely pointed; pectoral shield scutiform, truncated in front; coxæ short, rugose; relative length of legs 1, 2, 4, 3; tibiæ and tarsi flattened and longitudinally sulcated; falces large, rugose, with four well-developed teeth on each internal margin and with a very powerful curved movable fang; palpi flattened, hairy, the two terminal joints expanded and longitudinally sulcated. Length of cephalothorax and abdomen together 17 millimetres.

Antananarivo (*Kingdon*); Fianarantsoa (*Shaw*).

I have compared three specimens of this singular species. It is allied to *C. paradoxa* of Java (Plate LVIII. figs. 5, 5 a, 5 b) and *C. avernalis*.

#### 7. CÆROSTRIS AVERNALIS, Butler.

Fianarantsoa (*Shaw*).

I was pleased to find even an injured example of this species among Mr. Shaw's Spiders, as, although of little value as a specimen, it is in a sufficiently recognizable condition to prove the constancy of the specific characters.

#### 8. EPEIRA LOCUPLES, n. sp. (Plate LVIII. figs. 2, 2 a, 2 b.)

♀. Cephalothorax black; caput clothed with whitish hair; legs castaneous, the tarsi orange-yellow, tarsal claws black; tibiæ and tarsi of third and fourth pairs of legs broadly banded with black; palpi castaneous; maxillæ and labium blackish, with whitish borders; pectoral shield yellowish, with black border; abdomen sordid whitish (probably bright chrome-yellow in life), two or three transverse lines across the anterior margin and six central impressed dots in pairs black; ventral surface black, with a triangular basal marking, a semi-circular patch on each side, and two transverse ellipsoidal spots a short distance in front of the spinnerets, sordid whitish (probably yellow in life).

Cephalothorax of the usual form, almost circular behind the caput, its posterior area deeply depressed and with two lateral diverging sulci



from the commencement of the depression on each side; caput covered sparsely with long depressed hair, directed forward and projecting beyond the anterior margin; a central shallow rounded depression; oculiferous tubercles prominent, the central one X-shaped, the anterior pair of eyes much larger and wider apart than the posterior pair; the lateral tubercles slightly oblique, the anterior eyes upon them being larger than the posterior; abdomen broad, oval, hairy in front; epigyne linguiform, with a well-defined marginal ridge; pectoral shield pentagonal; falces acutely quadridentate on each interior margin, the third denticle from the proximal extremity being largest, movable fang curved and tolerably powerful; palpi hairy; legs rather hairy, their relative length being 1, 2, 4, 3, the second and fourth pairs nearly equal. Length of cephalothorax and abdomen together 10 millimetres.

Antananarivo (*Kingdon*).

PYRESTHESIS, n. gen. (*Thomisidæ*)<sup>1</sup>.

Apparently nearest to *Loxobates*, Thorell.

Length of cephalothorax rather greater than the width behind, and half as wide again as, the caput; dorsal surface to a little beyond the middle nearly flat, slightly sloping forwards, behind the middle abruptly sloping backwards; height just behind the middle equal to width at widest part; eyes occupying the whole anterior portion of the caput, oculiferous tubercles only indicated by little connecting ridges between the eyes; eyes arranged in two arched series, the anterior lateral eyes being the largest and the posterior lateral the smallest; central eyes forming a nearly perfect quadrangle; front margin of caput rounded, unarmed; external margin of falces with a smooth longitudinal ridge; legs very slightly compressed, nearly cylindrical, short, with a few scattered bristles but no distinct spines; abdomen globular, very slightly longer than broad, very slightly convex below.

Type *P. cambridgii*.

9. PYRESTHESIS CAMBRIDGII, n. sp. (Plate LVIII. figs. 6, 6a, 6b, 6c.)

♀. Cephalothorax black, tibiae banded with yellow; coxæ olivaceous; abdomen above yellow, with scarlet border; the yellow area crossed by three transverse broad black bands, the first and second of which are connected in the centre by a short longitudinal band, and the second and third at their extremities; the first of these bands is arched, and the two others are slightly angulated and clavate at their extremities; a fourth very abbreviate and disconnected transverse band followed by a rounded black spot upon the posterior area; under surface dark olivaceous.

Cephalothorax smooth, with scattered hairs upon the caput, the central oculiferous tubercle indicated by a slight swelling of the sur-

<sup>1</sup> The Rev. O. P. Cambridge, to whom I sent a sketch of this Spider, writes that it "would seem to be near *Syurma*, Simon; but the thoracic region is apparently too much elevated for that genus."

face and by indications of connecting ridges between the eyes, posterior pair of eyes slightly wider apart than the anterior pair, of about equal size; lateral eyes placed obliquely, the anterior eyes fully twice the size of the central ones and four times as large as the posterior lateral ones; pectoral shield cordiform; falces smooth, with wavy external margins and hairy internal surfaces; maxillæ long, in-arched, smooth; abdomen rounded, slightly pointed behind, and almost flat below. Legs very short, their relative length 2, 1, 4, 3; the anterior pair as follows—femur 2 millimetres, tibia including knee-joint  $2\frac{1}{2}$ , tarsi 2; second pair—femur  $2\frac{1}{3}$ , tibia  $2\frac{1}{3}$ , tarsi 2; third pair—femur  $1\frac{1}{2}$ , tibia  $1\frac{1}{2}$ , tarsi  $1\frac{1}{2}$ ; fourth pair—femur 2, tibia  $1\frac{2}{3}$ , tarsi  $1\frac{1}{2}$ ; the legs entire therefore being—first pair  $6\frac{1}{2}$  millimetres, second  $6\frac{2}{3}$ , third  $4\frac{1}{2}$ , fourth  $5\frac{1}{3}$ . Length of cephalothorax and abdomen together 8 millimetres, of abdomen alone  $5\frac{1}{2}$ .

Antananarivo (*Kingdon*).

#### EXPLANATION OF PLATE LVIII.

Fig. 1. *Epeira slateri*, Butl., p. 730.

1 a. ———, profile view.

1 b. ———, falx.

2. ——— *locuples*, Butl., p. 732.

2 a. ———, profile view.

2 b. ———, falx.

3. *Drassus malagassicus*, Butl., p. 730.

3 a. ———, profile view.

3 b. ———, palpus.

4. *Cærostris stygiana*, Butl., p. 731.

4 a. ———, profile view.

4 b. ———, view of abdomen from behind.

5. ——— *paradoxa*, Dolesch, p. 732.

5 a. ———, profile view.

5 b. ———, view of abdomen from behind.

6. *Pyresthesis cambridgii*, Butl., p. 733.

6 a. ———, profile view.

6 b. ———, caput with eyes.

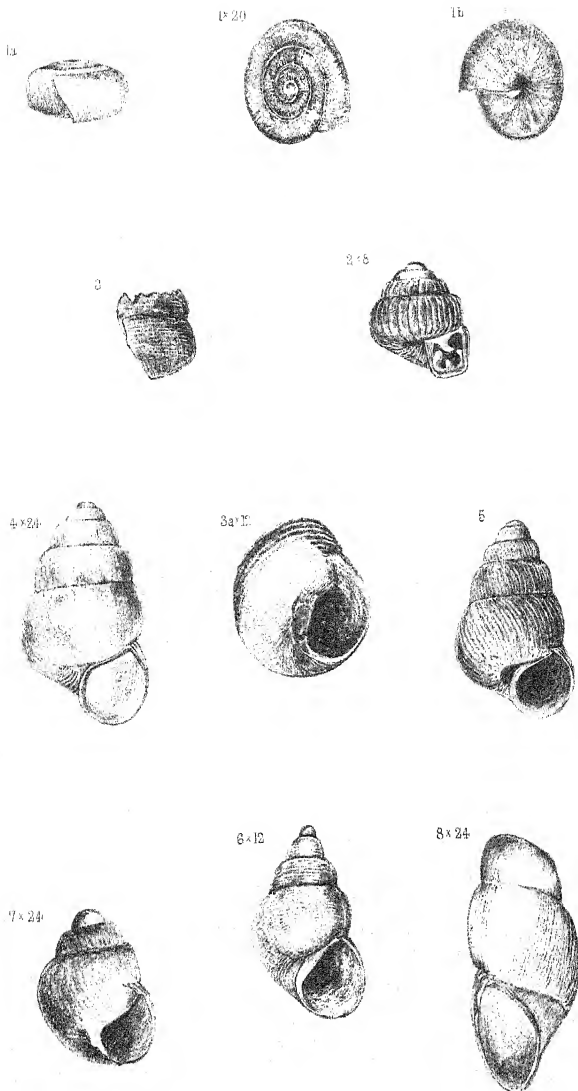
6 c. ———, falx.

#### 5. Descriptions of Shells from Perak and the Nicobar Islands. By Lieut.-Col. H. H. GODWIN-AUSTEN, F.Z.S., and G. NEVILL, C.M.Z.S.

[Received November 6, 1879.]

(Plates LIX. & LX.)

The shells from Perak described in this paper were collected by Surgeon-Major E. Townsend, then with H.M. 3rd Regt. Buffs, on the expedition against the rebellious Malays in 1875-76. Some of the smallest were found in the caves of Bukit Punong or Pondong, an isolated conical limestone hill about 1000 feet high. The collection brought to Calcutta was a very extensive and most interesting one, proving the richness of the land-molluscan fauna of that portion of the Malay peninsula, and how much more still remains to be



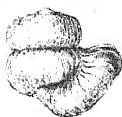
PERAK AND NICOBAR SHELLS



1 & 2a



1a



1b



3 & 2a



2a



3a



5 & 2a



4 & 2a



6 & F



6a



5a & 2a



4a



4a





found by future naturalists who may visit the country with more leisure than Dr. Townsend could give during the progress of a military expedition.

The thanks of all interested in malacology must be given him for the interesting new forms he has made us acquainted with.

The Nicobarese shells were collected by Dr. Ferdinand Stoliczka, and were among the large and valuable collections which he bequeathed to the Indian Museum, Calcutta.

*ENNEA PERAKENSIS*, n. sp. (Plate LIX. fig. 2.)

*Testa parva, viridescenti-crystallina, nitida, solida; spira paululum elevata, trochiformis, profunde et aperte umbilicata in modo "solariformi" dicto, apice obtuso atque lævi; superne elegantissime regulariterque transversim sulcata, sulcis pervalidis, planiusculis subrectisque (vix flexuosis); anfractu tertio sulcis confertis, ultimis duobus sulcis æqualibus atque distantibus ornatis; subtus ad basin subplana, circa umbilicum subcarinata, prope peripheriam sulcis validis subito fere evanidis, in umbilico rursus conspicue patentibus; anfract. 5, convexiusculi, ultimo basi plano; apertura perfecte quadrangularis, dentibus 4 coarctatis, dente parietali percrasso, oblique contorto, conspicue prominente; perist. album, incrassatum, marginibus subparallelis, fere rectis, margine externo inferne dente parvo munito et ad basin abrupte angulato, margine basali cum dente, paululum majore, in medio munito, margine columellari superne callositate levi ad dentem parietalem juncto, reflexo et paululum obliquo, inferne acute angulato et dente valido munito.*

Alt.  $1\frac{2}{5}$ , diam. 2 mill. The other specimen measures, alt.  $1\frac{1}{2}$ , diam.  $1\frac{1}{2}$  mill. (*G. N.*).

I obtained two fine specimens of this remarkable new species, by washing the larger shells obtained by Dr. Townsend in the Buket Pondong cave. I know of no shell which surpasses it in interest, as regards sculpture: the apical two whorls are smooth, the next closely, transversely sulcated, and the last two very conspicuously distantly so; the "sulci" are almost upright, only slightly flexuous, with their interstices about twice as broad as themselves; underneath, the base appears beautifully fimbriated near the margin, owing to these sulcations apparently suddenly stopping a short distance from the periphery, though in reality one can trace them across the base; but to do so requires the lens and a good light. To all appearance the middle of the base is smooth, polished and shining. These sulcations appear again within the deep, open, and solariform umbilicus, as conspicuous as ever. The characters of the aperture &c. are so excellently represented in Colonel Austen's figure, that it would be a waste of time to further describe them (*G. N.*).

From the peculiar form of this shell, Mr. Nevill considered it a new subgenus of *Ennea*; and following his description of it he says:—"It is of interest to note that, in the very extensive collection made by my friend Dr. Townsend in these caves, there was not so much as a broken piece of any species of *Streptaxis* or *Ennea*, both so

common in similar ground in the nearest known countries, Tenasserim and Penang."

I have deemed it best, considering that only two specimens were found, and that they are so similar in general form to immature specimens of *Ennea stenopylis*, Bs., from the Khasi hills, not to found this new subgenus until further examples are obtained proving that the shell as given in the Plate is a mature form; and I trust Mr. Nevill will pardon this caution on my part (G.-A.).

NANINA (MICROCYSTINA) TOWNSENDIANA, n. sp. (Plate LIX. fig. 1.)

*Testa minutissima*, N. minimæ (H. Adams, P. Z. S. 1869), *a me detectæ, affinis; vix rimata, planiuscula, vitrea, nitida et levis; anfract. 4½, perlente crescentes, sutura impressa sejuncti, ultimo majore, prope aperturam vix dilatato, ad peripheriam rotundato, basi convexiusculo; apertura minima, angusta, margine columellari perobliquo vix descendente.*

Alt.  $\frac{1}{8}$  (prox.), diam. 1 (prox.) mill. (G. N.)

A small and almost microscopic form, which I obtained by washing larger shells found by Dr. Townsend in the Buket Pondong Cave. It belongs to a group which appears to me to abound nearly everywhere in the Indo-Malay Province, but which has hitherto been almost universally neglected, on account of the small size, and absence of marked sculpture and coloration, which characterize these shells. Species have nevertheless been described by MM. Issel (from Borneo), Martens, Semper, and Mörch (Eastern Archipelago), Benson (India and Burma), Morelet and H. Adams (Mascarene I.), &c. I have not any books by me for reference; but I am almost confident that it was for a species of this group that Mörch, Journ. de Conchyl. for 1872, formed a new subgenus "*Microcystina*" (as distinct from the sculptured *Microcystis*, of Beck), with *N. rinkii*, Mörch, from the Nicobar Islands, as his type! *Microcystina* seems to me to bear somewhat the same relationship to the larger and closely allied mollusks known as *Macrochlamys*, that the European species of *Vitrea* (of Fitzinger) do to *Hyalina* (G. N.).

M. Crosse has described<sup>1</sup> a new form from the same locality, *II. (Geotrochus) perakensis*.

CLAUSILIA? juv. (Plate LIX. fig. 8.)

Another young shell figured, which I doubtfully refer to the above genus (G.-A.).

Perak. (Indian Museum, Calcutta.)

PUPISOMA? sp. juv. (Plate LIX. fig. 7.)

This shell I have figured although young, it being often of importance to know the immature forms, which so puzzle a conchologist when sorting out a collection. It probably belongs to the above subgenus of Stoliczka (J. A. S. B. 1873, p. 32).

Alt. .045 inch. (G.-A.)

Perak. (Indian Museum, Calcutta.)

<sup>1</sup> Journ. de Conchyl. t. xix. p. 199, pl. viii. f. 4.



ACMELLA MORELETIANA, Nevill (Handl. Moll. Ind. Mus. 1878, p. 251, Batti Malve). (Plate LIX. fig. 4.)

*Testa minima, subaperte umbilicata, conico-turrita, hyalina, per-lucida, polita atque nitida; circa regionem umbilicalem confertim plicata, plicis validis, regulariter incisis, prope suturam [sub "lente"] minutissime striatula, striis sæpe haud videndis; anfract.  $5\frac{1}{2}$ , convexiusculi, gradati, sutura excavata sejuncti, ultimo globuloso, inferne convexo; apertura perfecte rotundata, marginibus approximatis, sed haud continuis; peristomate paululum incrassato, margine columellari sensim rotundato, umbilicum haud tegente.*

Long. 2, diam.  $1\frac{1}{3}$  mil. (G. N.)

The late Dr. Stoliczka found this species in abundance on the little island of Batti Malve, twenty miles south of Car Nicobar. The regular distinct plications of the central portion of the base, which crowd the interior of the umbilicus, are a peculiar characteristic; in some of the scarcely mature specimens, under a strong lens, I can just detect near the suture, here and there, traces of a most minute striation; otherwise the shell is of a perfectly smooth, polished, and translucent texture; the whorls are more convex than those of *A. roepstorffiana*, the aperture higher in proportion to its breadth, with the columellar margin not bent abruptly back over the umbilicus, but evenly and gently rounded. Colonel Austen's figures of both these species are excellent, scarcely to be surpassed. The only possible criticism is that the margins of the aperture of this species, in especial, may to some appear continuous, which is not the case (G. N.).

ACMELLA ROEPSTORFFIANA, Nevill (Handl. Moll. Ind. Mus. 1878, p. 25, Katchall, Nicobar Islands). (Plate LIX. fig. 5.)

*Testa minima, peranguste umbilicata, conico-turrita, nitida, sub-translucida, sericina, omnino distincte, subconfertim et regulariter striata, striis acute filiformibus, obliquis, ad basin flexuosis, prope regionem umbilicalem paululum magis conspicuis; anfract. 5, gradati, vix convexiusculi, sutura excavata sejuncti, ultimo sub-cylindrico, ad peripheriam paululum compresso; apertura minima, subcircularis, peristomate incrassato, haud continuo, subobsolete duplici, margine externo perconvexo, margine columellari valide retrorsum arcuato plus minusve umbilicum tegente.*

Long.  $1\frac{1}{2}$ , diam. 1 mill. (G. N.)

This small species, a few specimens only of which were found by the late Dr. Stoliczka at Katchall, one of the Nicobar Islands, is distinguished from all the other described species of the genus by its being throughout regularly, rather strongly striated, the striæ being acute and "thread-like;" the shell is of a silky, translucent and shining texture, with 5 almost cylindrically turreted whorls, the last a trifle compressed at the periphery; the umbilicus is exceedingly narrow and partially overlapped by the thickened peristome, which here and there, under the lens, clearly shows a duplex character; the aperture is very small, unusually broad in proportion to

its height, and almost circular, with the margins almost but not quite continuous, the columellar one being abruptly bent back over the umbilicus, and then beautifully and boldly rounded. I named this interesting little species after my friend Mr. F. A. de Roepstorff, Dep. Sup. Andaman-I. Commission, to whom both the Museum at Copenhagen and myself are indebted for many interesting Mollusca and Coleoptera from the Andaman and Nicobar Islands (*G. N.*).

*OPISTHOSTOMA PERAKENSIS*, n. sp. (Plate LX, figs. 1, 1*a*, 1*b*.)

Shell dextral, much depressed, ovate, the last whorl reflected half a turn back and rising to a level with the penultimate suture; colour ruddy brown; sculpture fine ribbing, wide apart and regular to the apex. Spire depressed, sides parallel, apex flat, suture deep. Whorls 4, sides convex; penultimate and antepenultimate equal, the last reversed. Aperture circular, vertical; peristome double, inner lip circular, continuous; the outer lip angular below.

Size, alt. 0.30, major diam. 0.33 in.

Perak. (Indian Museum, Calcutta.)

Two examples of this very curious extremely minute shell were discovered by Mr. G. Nevill when washing out some of the larger specimens of the shells from the limestone caves, showing how often such delicate small species must be overlooked and lost by collectors (*H. H. G.-A.*).

*OPISTHOSTOMA PAULUCCIÆ*, Crosse and Nevill, Journ. de Conchyliologie, t. xix. pp. 197 & 205 (1879), pl. viii. fig. 1. (Plate LX. figs. 2, 2*a*, 2*b*.)

Shell dextral, very depressed, ovate, the last whorl reflected more than a half turn backwards and rising to the top of the antepenultimate whorl; colour ruddy brown; the ribbing strong and wide on the last two whorls, very close and fine on those above. Spire depressed, sides parallel to axis, apex flat, suture moderately impressed. Whorls 4, penultimate and antepenultimate equal, their sides flat, the last whorl rounded and reversed. Aperture triangular, subvertical. Peristome double, both inner and outer lips.

Size, alt. 0.30, major diam. 0.33 in.

Perak. (Indian Museum, Calcutta.)

This shell, a close ally in size and form of *O. perakensis*, presents a few characters by which it can be easily distinguished. I have, however, only seen one specimen, which was found in a similar way to that above described. Mr. Nevill informed me, before leaving for India, that this shell had been described by M. H. Crosse from a specimen he had sent him (*G.-A.*).

*DIPLOMMATINA CROSSEANA*, n. sp. (Plate LX. figs. 3, 3*a*.)

Shell dextral, elongately fusiform, sculpture widely and regularly costulate, colour pale sienna-brown; spire gradually decreasing, suture moderately impressed. Whorls 7; antepenultimate the largest and most swollen; penultimate short, from the last rising rapidly on it; constriction behind the aperture. Aperture rectangular, sub-

vertical; the columellar margin perpendicular, with usual tooth. Peristome double, slightly sinuate on the outer margin, viewed from side.

Size, alt. 0.054, diam. 0.03 in. (*G.-A.*).

Perak. (Indian Museum, Calcutta.)

*DIPLOMMATINA (PALAINA) MIRABILIS*, n. sp. (Plate LX. figs. 4, 4a, 4b.)

Shell dextral, solid, elongately pyramidal; colour pale umber-brown; sculpture regular ribbing in high relief: this costulation on the basal side is not continuous up to the columellar margin, but the epidermal layer terminates on a defined line level with the upper angle of the aperture and encloses thus a lunular smooth area very characteristic of this species. Spire rapidly decreasing, sides flat, apex pointed, suture well impressed. Whorls 7, the penultimate the largest, sides convex. Aperture subvertical, straight on the outer margin, broadly ovate; columellar margin straight, the tooth of flattened form. Peristome continuous, closely double.

Size, alt. 0.07 inch, maj. diam. 0.04 in. (*G.-A.*)

Perak.

Of this very distinct and beautifully formed shell only one specimen was found. It presents characters which show a decided departure from the subgenus *Palaina*; and no doubt other allied species will eventually be found in this area.

*DIPLOMMATINA (PALAINA) SUPERBA*, n. sp. (Plate LX. figs. 5, 5a.)

Shell sinistral, elongately pyramidal, very solid; colour ruddy ochre; sculpture fine close costulation, waved on the periphery of the last whorls, the apical whorls smooth. Spire very pointed, suture deep. Whorls 7.3, last very angular, almost keeled; the antepenultimate the broadest; the penultimate the most swollen. Aperture large, circular, very oblique. Peristome much thickened, widely double; the inner lip continuous; the outer angular on the outer margin, rounded below.

Size, alt. 0.094, maj. diam. 0.06 in. (*G. A.*)

Perak.

This is a very beautiful small species of *Palaina*; only one specimen was obtained.

(Indian Museum, Calcutta.)

*Diplommatica (Palaina) nevilli* (Crosse, Journ. Conch. t. xix. p. 205, pl. viii. f. 2), *Lagocheilus townsendi* (Crosse, l. c. p. 200, pl. viii. f. 3), and *Alycaeus perakensis* (Crosse, l. c. p. 206, pl. viii. f. 7) were also obtained by Dr. Townsend.

*GEORISSA MONTEROSATIANA*, n. sp. (Plate LIX. fig. 6.)

*Testa parva, sat tenuis, imperforata, fulva; apice laevi, corneo atque conspicue prominente; anfract. 5, convexi, celeriter crescentes, concentrice confertimque sulcati, sulcis minutis et regularibus,*

*ultimo maximo, rotundato, basi vix convexo; apertura superne contracta, inferne late dilatata, margine columellari callose incrassato, retrorsum paululum deflexo, margine externo convexo rotundato.*

Long.  $2\frac{1}{2}$  (vix), diam.  $1\frac{7}{8}$  mill.

Another shell found in the same locality by Dr. Townsend. The sculpture and characters of the aperture are admirably represented by the figure; the last whorl but one, however, should be considerably more convex and consequently less turreted and less conspicuous; the base of the last whorl is a shade too convex, giving the shell an umbilicate appearance, which it does not possess (*G. N.*).

GEORISSA SEMISculPTA, n. sp. (Plate LIX. figs. 3, 3 a.)

*Testa parva, solida, viridescens, imperforata; anfractu antepenultimo valide sulcato, sulcis concentricis atque approximatis, ultimo subcompresso, basi planiusculo, superne concentricè valdeque sulcato, inferne lævi; apertura superne perangusta, inferne late dilatata, margine columellari incrassato, abrupte retrorsum deflexo ac callositate validissima regionem umbilicalem tegente instructo, margine externo inferne subangulato.*

Diam. (ult. anfract.) 2 mill.; alt. apert. 0.05 inch.

A single mature specimen, with the spire unfortunately broken, was found by Dr. Townsend in the Buket Pondong cave in Perak. It differs so conspicuously from every other known species, and would be so easily recognized again, that I have not hesitated to describe it, though I do not usually do so when I possess only a unique specimen. The figure is perfect (*G. N.*).

EXPLANATION OF THE PLATES.

PLATE LIX.

- Fig. 1. 1a, 1b. *Microcystina townsendiana*, n. sp.,  $\times 20$ , p. 736.  
 2. *Ennea perakensis*, n. sp.,  $\times 8$ , p. 735.  
 3. 3a *Georissa semisculpta*, n. sp.,  $\times 12$ , p. 740.  
 4. *Aemella moreletiana*, n. sp.,  $\times 24$ , p. 737.  
 5. — *roepstorffiana*, n. sp.,  $\times 24$ , p. 737.  
 6. *Georissa monterosatiana*, n. sp.,  $\times 12$ , p. 739.  
 7. *Pupisoma*?, young,  $\times 24$ , p. 736.  
 8. *Clausilia*?, young,  $\times 24$ , p. 736.

PLATE LX.

- Fig. 1. 1a, 1b. *Opisthostoma perakensis*, n. sp.,  $\times 24$ , p. 738.  
 2. 2a, 2b. — *pauluccie*,  $\times 24$ , p. 738.  
 3. 3a. *Diplommatina crosseana*, n. sp.,  $\times 24$ , p. 738.  
 4. 4a, 4b. — *mirabilis*, n. sp.,  $\times 24$ , p. 739.  
 5. 5a. *Palaina superba*, n. sp.  $\times 8$ , p. 739.

6. Notice of a Collection of Mammals and Reptiles from Cyprus. By Dr. A. GÜNTHER, F.R.S.

[Received November 12, 1879.]

Lord Lilford has recently received from one of his collectors a small collection from the island of Cyprus, and has kindly submitted the Mammals and Reptiles to me for examination. The species are the following, those new to the fauna of Cyprus being marked with an asterisk.

1. CYNONYCTERIS COLLARIS.

In the list of Cyprian animals compiled by Kotschy and published in Unger and Kotschy's 'Die Insel Cypern,' *Pteropus ægyptiacus* (*Cynonycteris ægyptiaca*) is enumerated as one of the two Bats<sup>1</sup> then known from the island; and, indeed, from the occurrence of this species in Egypt and in Syria, the fruit-eating Bat of Cyprus might have been expected to be that species. However, singularly enough, the Cyprian specimens (of which thirty-eight are in the collection) exhibit the distinctive character (a somewhat shorter thumb) on account of which *C. collaris* has been separated from *C. ægyptiaca*<sup>2</sup>. *C. collaris* has been found hitherto only in South Africa and on the Gaboon; and before we admit so singular a distribution of two representative species we must feel disposed to question the specific value of the character by which the two forms have been separated.

\*2. VESPERUGO KUHLLI. Two specimens.

\*3. MUS ALEXANDRINUS. Two specimens.

\*4. ACANTHODACTYLUS BOSKIANUS. One specimen.

\*5. OPHIOPS ELEGANS. Eight specimens.

6. STELLIO CORDYLINA. Numerous specimens.

7. CHAMÆLEON VULGARIS. One specimen.

8. ZAMENIS ATROVIRENS, var. CARBONARIA. Two specimens.

9. TROPIDONOTUS NATRIX. One specimen.

10. UROLOPELTIS LACERTINA. One specimen.

11. (? VIPERA LEBETINA, L.) = VIPERA EUPHRATICA, Martin, = *Vipera mauritanica*, Dum. & Bibr. Two specimens<sup>3</sup>.

\*12. HYLEA ARBOREA. Four specimens.

13. RANA ESCULENTA. One specimen.

<sup>1</sup> The second is *Vespertilio murinus*.

<sup>2</sup> Mr. Dobson, who has examined the specimens, agrees with us in considering them to be *C. collaris*.

<sup>3</sup> The larger of these specimens had in its stomach the remains of a species of *Saxicola* (?). This is a very rare instance of a viperine snake swallowing a bird.

## 7. On the Fishes of Weston-super-Mare.

By F. DAY, F.Z.S.

[Received November 18, 1879.]

(Plates LXI. &amp; LXII.)

Having visited Weston-super-Mare in July this year, and remained there throughout most of August, I directed my attention to the sea-fishes of that place, which, situated on the estuary of the Severn and the Wye as it enters the British Channel, is a locality too well known to call for any description: for the same reason I have deemed it unnecessary to allude to the remarkably high spring tides which occur. The amount of fishing going on was inconsiderable, boating apparently being a more profitable occupation. The shrimpers were daily at work; while stakes in narrow passes permitted the erection of stationary nets, into which small fishes and Crustacea were swept by an ebbing tide. Here I obtained most of my specimens; but the place so swarms with crabs (*Carcinus mænas*, Linn.), that numerous little fishes were found partially devoured when the tide had ebbed sufficiently to permit the nets being examined. During the end of the first week in August, enclosures of a semicircular form were erected on the sands for the purpose of capturing flat fish (Pleuronectids). The one that appeared to be most successful was about 200 yards in length, the stakes raised to about three feet above the ground; and to these a long net was affixed.

I daily went to the stake- and shrimp-nets, as well as to the enclosures on the sands already referred to.

In drawing up this paper I took as my groundwork Mr. W. Baker's (of Bridgewater) 'Fishes of Somersetshire,'<sup>1</sup> including Mr. Higgins's<sup>2</sup> Remarks upon the Fishes of Weston-super-Mare, which he collected between the end of June and November 27, 1860. I likewise examined the specimens in the Taunton Museum, and the more extensive collection in that of Weston<sup>3</sup>.

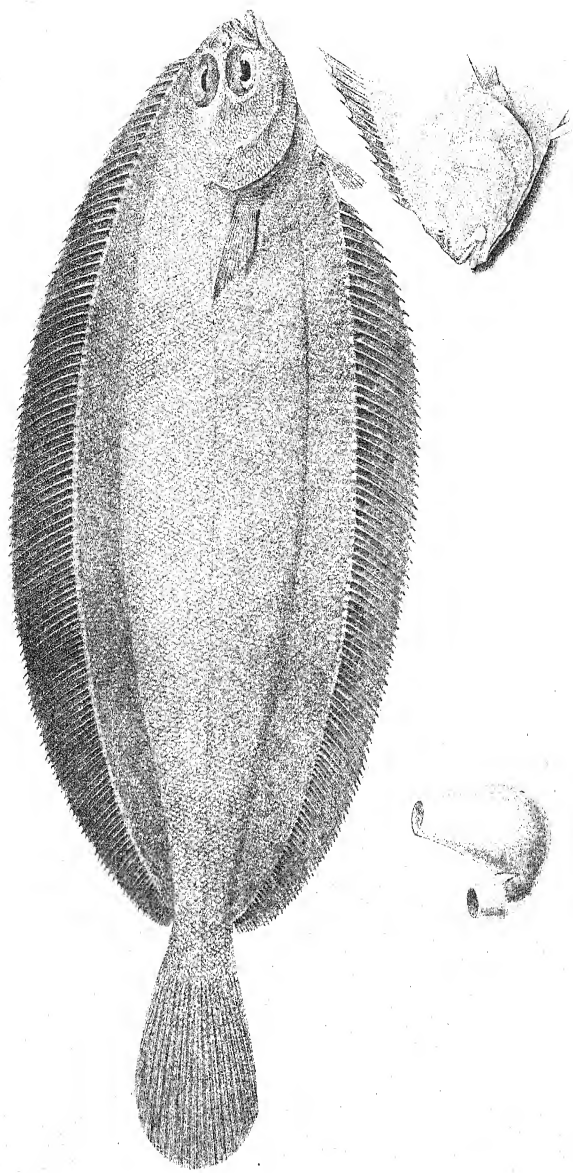
The fishermen complained that the season had been an unprecedently bad one, but that at times fishes had appeared most unexpectedly. This they could not account for, nor even propose any solution. Later on (September) large numbers of Soles were found to be present in the Channel, which had not been suspected; and many that were taken weighed as much as four pounds each.

Reports from various sources lead one to the conclusion that

<sup>1</sup> Somersetshire Archaeological and Natural History Society, 1851.

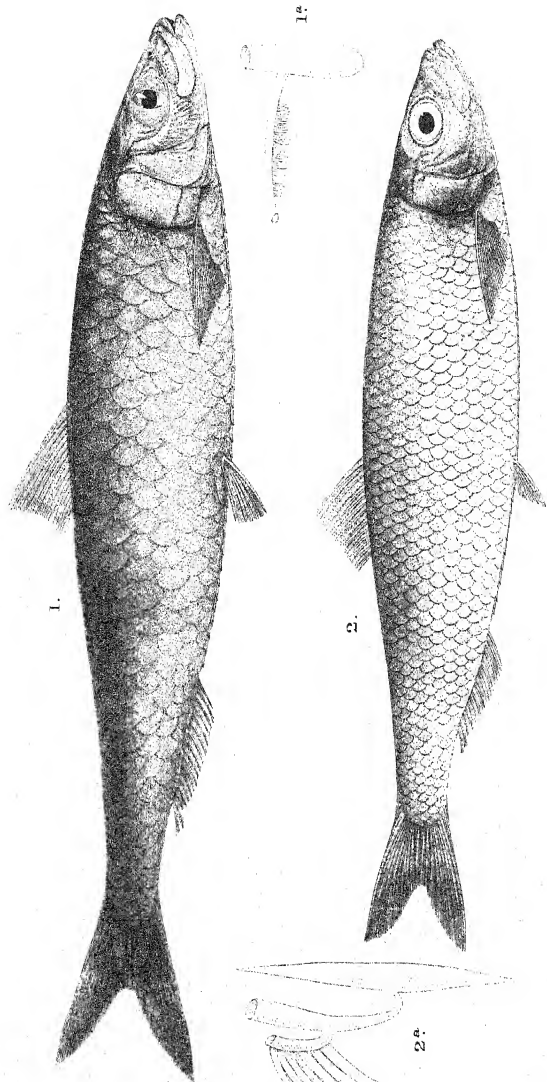
<sup>2</sup> 'Zoologist,' 1861.

<sup>3</sup> This Museum is under Mr. Mable, to whom belongs most of the credit for its ever having been instituted. Commencing life as a shoemaker, he first set up a school for the poorest class. He also collected the materials from which the Museum has sprung, of which he is now Curator, as well as Principal of the Institution attached to it.









Achilles, del. et lith.

Mintern Bros. imp.

1. CLUPEA PILCHARDUS. 2. CLUPEA SPRATTUS.



the migration of marine and littoral species of fish this year has been rather peculiar. Along the coast of France some forms have almost forsaken their usual haunts, but appeared in other stations, from which they had in former seasons been almost absent. Captain Salmond, of the 'Charlotte and Jane,' observes, respecting his fishing-voyages to the North Sea this year:—"It turns out, up to the time I write (June 2nd), that it is a failure in regard to Soles; also the offal is not so plentiful as in other summers. At Heligoland the fishermen have had a bad time, some being on the brink of starvation." It was stated in the papers during October that "Eastern Siberia has been suffering from famine, no whales or fish having visited those waters this summer."

Temperature is well known to exert a great influence on the migration of fishes, while we are aware of having experienced a long and severe winter, followed by a very cold spring and a comparatively colder summer. This may to a considerable extent account for the abnormal manner in which the distribution (not general supply) of marine forms has occurred throughout the last season. I therefore deem it advisable to give the temperature of the air as observed at the Royal Observatory, Greenwich, and for which I am indebted to W. Ellis, Esq.

*Deviation of Mean Temperature from Average of 20 Years.*

November 1878	.....	—3 <sup>0</sup> ·0
December „	.....	—7·1
January 1879	.....	—6·9
February „	.....	—1·5
March „	.....	—0·3
April „	.....	—4·3
May „	.....	—4·7
June „	.....	—2·9
July „	.....	—4·5
August „	.....	—2·0

The above figures show that the temperature of the air has been below the average of that experienced during the last twenty years in every month referred to.

While engaged on this paper, by the kindness of the Earl of Ducie, F.R.S., I have been permitted to examine and make use of the diary kept by his lordship while on the yachting-tours which he has for several successive seasons made to Ballinskellig Bay, in Ireland, situated on the same latitude as Greenwich and Weston-super-Mare. The notes are so complete and interesting that I cannot but regret merely giving a summary, for such accurate data are probably unattainable elsewhere. During the last four years fishing has been done from a 30-ton cutter, but in 1873 and 1874 from yacht-boats. The takes have been as follows:—

Species.	1873.	1874.	1876.	1877.	1878.	1879.
Red Mullet .....	27	11	1	4	1	2
Sea-Bream .....	61	13	176	210	57	1
Red Gurnard.....	...	...	20	18	12	7
Sapphirine Gurnard.....	...	...	24	29	59	71
Grey Gurnard .....	...	...	95	54	78	178
Piper .....	...	...	4	1	...	9
Mackerel .....	222	118	110	2	108	...
Dory .....	1	4	5	4	5	27
Cod, over 5 lb. ....	...	...	14	4	4	3
Whiting.....	84	124	170	306	114	310
Whiting Pout .....	95	10	32	6	12	8
Pollack, over 4lb.....	...	...	33	19	43	11
Hake .....	...	...	...	...	...	2
Ling .....	9	13	22	23	15	14
Turbot .....	1	4	15	115	47	57
Brill .....	4	...	16	29	34	92
Whiff .....	...	...	7	7	2	4
Plaice.....	51	147	190	582	374	1032
Dab .....	...	...	56	77	54	326
Lemon Dab .....	...	...	13	8	5	20
Flounder .....	...	...	19	43	51	38
Sole .....	51	147	250	289	403	683
Lemon Sole .....	...	...	7	9	7	2
Conger .....	86	56	22	29	43	6

If we divide the fishes captured in the years 1878 and 1879 into families, we find as follows :—

	1878.	1879.
Mullidæ .....	1	2
Sparidæ .....	57	1
Triglidæ .....	149	265
Carangidæ .....	113	28
Gadidæ.....	188	348
Pleuronectidæ .....	977	1954
Muraenidæ .....	43	6

One cause which has great bearing upon the presence or absence of certain kinds of fish is, as already observed, the temperature of the sea. The following figures from Lord Ducie's notes show what was the average temperature at the surface daily at 7 A.M. :—

1878, July ....	63°	August..	61·8°
1879, „ ....	53·5°	„ ..	56·8°

Consequently in July 1879 we find the temperature of the air was 4°·5 lower than the average of the mean temperature for the last twenty years, and of the surface-water of the sea 9°·5 less than in 1878; while in August the mean temperature of the air was 2°·0 less than the average for the last twenty years, and of the surface-water of the sea 5° lower than in 1878.

On July 21, 1878, at 12.30 A.M., the temperature of the sea is thus recorded :—At surface, 71°; at 1 fathom, 67°·5; 2 fathoms, 66°;

3 fathoms, 65°; 4 fathoms, 63°; 5 fathoms, 61°; 6 fathoms, 60°; 7 fathoms (at bottom), 59°.

If I now confine my figures to the temperature and species of fishes taken by trawling solely in Ballinskellig Bay in 1878 and 1879, I find as follows:—Trawling was only employed on four days in July 1878, in from 3 to 5 fathoms of water, with the surface-temperature at 7 A.M. 60° to 62°, or having an average of 61°: the total captures were:—7 Sapphirine Gurnards; 1 Dory; 18 Turbot; 11 Brill; 99 Plaice; 11 Dabs; 11 Flounders; 157 Soles; 2 Lemon Soles. In August 1878 trawling was employed on 15 days, with the surface-temperature at 7 A.M. 60° to 64°, giving an average of 62°. It was remarked on August 7th that four scrapes were taken with a 16-foot beam-trawl, and that the Plaice captured nearly doubled the Soles in number, probably due to the speed at which the boat was driven, and to the elevation of the "head-rope" above the ground, as effected by the trawl-beam. Two of the scrapes were in 3 fathoms and two in 5 fathoms of water; but there was no very marked difference in the result. The total captures in the 15 days of August were as follows:—1 Bass; 2 Sea-Bream; 31 Sapphirine Gurnards; 3 Grey Gurnards; 4 Dory; 18 Mackerel; 34 Turbot; 28 Brill; 194 Plaice; 25 Dabs; 23 Flounders; 246 Soles; 1 Lemon Sole.

In the year 1879, trawling was employed for 12 days in July, with the surface-temperature at 7 A.M. 50° to 56°, having an average of 53°·9. The total captures were:—1 Sea-Bream; 2 Sapphirine Gurnards; 2 Grey Gurnards; 8 Dory; 2 Angler; 2 Ling; 25 Turbot; 32 Brill; 393 Plaice; 117 Dabs; 4 Lemon Dabs; 2 Flounders; 229 Soles; 1 Lemon Sole; 4 Whiffs. During August trawling was carried on 11 days, with the surface-temperature at 7 A.M. 54° to 58°, having a mean of 56°·5. The total captures were:—9 Sapphirine Gurnards; 5 Grey Gurnards; 4 Piper; 12 Dory; 1 Angler; 19 Turbot; 45 Brill; 448 Plaice; 137 Dabs; 5 Lemon Dabs; 4 Flounders; 269 Soles. We find, therefore, that the fishes captured in the two years were about as follows:—

	Bass.	Sea-Bream.	Gurnards.	Dory.	Mackerel.	Angler.	Gadidæ.	Pleuronectoids.
July 1878, 4 days, mean temp. 7 A.M. 61° ..	...	...	7	1	...	...	...	309
" 1879, 12 days, " " " 53·9...	...	1	4	1	...	1	1	807
Aug. 1878, 15 days, " " " 62° ...	1	2	34	4	18	...	...	551
" 1879, 9 days <sup>1</sup> , " " " 56·5...	...	1	4	8	...	2	2	807

<sup>1</sup> Trawling was resorted to on eleven days, but only on nine of them have I the numbers of each species captured.

There appear to have been less Gurnards taken in the 21 days' trawling in 1879 than in the 19 days in 1878; more Dory (9 instead of 5); no Mackerel (in place of 18 in 1878); but a very much larger number of Pleuronectoids, 1614 in place of 860 in 1878. Still one must not attribute the increase of Soles caught entirely to a local augmentation in the number of fish in the sea, as, in the first place, the "sweep" of the trawl was as 5 to 4, being 50 feet "spread" in 1879 instead of 40 feet in 1878. The bridles, *i. e.* the ropes to the "Otter heads," or weighted wooden kites, which run along the bottom, were rather better adjusted in 1879; while the weather for working the trawl was more propitious, consequently it was more frequently employed. A depth of about 5 fathoms was found to be most favourable in 1879, whereas in warmer seasons 3 to  $3\frac{1}{2}$  fathoms have been found to yield the best captures. The facilities for the different kinds of fishing varied with the weather: thus the takes of Whiting show fine weather, when line-fishing could be attempted outside the Bay.

Although many deductions might be drawn from Lord Ducie's notes, I propose deferring them for the present, in the hope of obtaining the general returns of the sea-fisheries of the United Kingdom. It would, however, appear that among the Soles and flat fishes generally, striking anomalies in distribution have occurred during the past season. They would seem to have more or less forsaken (for a time, at least) the North Sea, and to have appeared in augmented numbers on the S.W. coast of Ireland and the Bristol Channel. Whether the temperature of the sea in certain localities has been so low as to cause the migration of the food of these fishes, or the fishes themselves have been acted on by cold, through the medium of the water, or both causes have combined, are questions worth investigating, but which I propose to defer for the present.

Passing on to the fishes themselves, I have added remarks to many species, frequently made, as will be observed, in other localities than at Weston.

#### LABRAX LUPUS, Lacép. The Bass.

I obtained several small examples, none of which exceeded a pound in weight. All were from the stationary shrimp-nets. It is observed, in Lord Ducie's diary, on August 10, 1878, that "in the North Bay the Bass were hunting the Sprats to the surface, the Gulls assisting. This went on all day, along the strand up to the embouchure of the Jung River."

#### POLYPRION CERNIUM, Val. Stone-Bass.

Somersetshire (*Baker*).

#### MULLUS SURMULETUS, Linn.

*M. barbatus*, De La Roche.

Somersetshire (*Baker*).

Lord Ducie took two examples on August 2nd this year in a trammel set in Ballinskellig Bay; while one was likewise similarly captured July 26, 1878.

PAGRUS VULGARIS, Cuv. & Val.

Somersetshire (*Baker*).

PAGELLUS CENTRODONTUS, De La Roche. Sea-Bream.

Somersetshire (*Baker*).

COTTUS SCORPIUS, Bloch. Sting-fish or Sea-Scorpion.

This fish is taken at Weston during the winter. I have received several examples, captured at Southend, at the mouth of the Thames, from Mr. Carrington, naturalist to the Royal Westminster Aquarium. The spines at the preopercular angle are occasionally reduced from three to two, while the usual number of the dorsal spines is 10, and of the anal rays 10 instead of 11 or 12.

COTTUS BUBALIS, Euphr. Father Lasher or Long-spined Sea-Scorpion.

*C. groenlandicus*, Cuv. & Val.; *C. labradoricus*, Girard; *C. ocellatus*, Storer.

The American form or variety is said to have "the ridges of the bones of the head tubercular, not covered with skin" (Günther, Catal. ii. p. 165). I find the same appearances in some examples received from Southend. The variety of *Cottus scorpius* mentioned by Couch as having a "row of tendrils hanging from the skin above the eyes" was probably an example of this species, which usually has a few short tentacles about the head and above the eyes, while there is frequently rather a large one at the outer end of the maxilla.

TRIGLA CUCULUS, Linn. Elleck or Red Gurnard.

*T. pini*, Bloch.

Occasionally taken at Weston.

TRIGLA LINEATA, Gmel.; Linn. Streaked Gurnard.

This, as well as the next two, are occasionally captured. This fish is said to be very seldom taken by a bait. Mr. Cornish ('Zoologist,' 1878, p. 423) observes that it is never taken on a hook. At the Westminster Aquarium I observe that these fishes become quite as tame as the other forms, taking pieces of mussel or shrimps as well as any other fish, and apparently with as little fear.

TRIGLA HIRUNDO, Bloch. Sapphirine Gurnard.

*T. pœcilopectera*, Cuv. & Val.

TRIGLA GURNARDUS, Linn. Grey Gurnard.

*T. cuculus*, Bloch; *T. blochii*, Yarrell.

I received one example from Mr. Carrington, captured at Southend, in which the white spots have run into narrow and sinuous lines, while a black blotch, surrounded by a light ring, exists on the first dorsal fin. The colours in this species vary exceedingly: in some there are no white spots, the upper half of the body being of a slate-grey, conjoined with which a black blotch usually exists on

the first dorsal fin (*T. blochii*). This dorsal blotch, however, as a rule, is present in all specimens, although in some it is faint, or merges into the colour of the remainder of the fin, while it frequently becomes lost in examples kept long in spirit. Occasionally the dorsal blotch instead of being round is semicircular.

This is said to be the most common form of Gurnard at Weston; but none of the genus were captured when I was there. Although Couch observes that *T. gurnardus* is less sensible to variations in temperature than any other form of British Gurnard, it is found to be the most difficult to keep alive in the Westminster Aquarium.

TRIGLA LYRA, Linn. The Piper.

Somersetshire (*Baker*).

Scouler (Mag. Nat. Hist. vi. 1833, p. 529) states this fish not to be rare at Glasgow, where it sometimes attains to 7 lb. weight. Lord Ducie found it this year more abundant than usual in Ballinskellig Bay, where in August he obtained nine with the trawl, in 1878 none, in 1877 one, in 1876 four.

AGONUS CATAPHRACTUS, Linn. The Pogge.

A local example exists in the Weston Museum.

TRACHINUS DRACO, Linn. Great Weever.

A single local example in the Weston Museum.

TRACHINUS VIPERA, Cuv. & Val. Little Weever.

I obtained a single specimen from the stationary fish-nets. The fishermen professed to regard these fish as very rare.

SCOMBER SCOMBER, Linn. The Mackerel.

A few (adult) are occasionally taken near Weston. Mr. Dunn, of Megavissey, observes (MS.) that "many have the fins of the belly red. Our fishermen carefully note them, as when they appear quantities of fish are always off the coast. \* \* \* Their ova float on the surface of the sea. \* \* \* During the month of September this year some hundreds of a fish-louse (*Rocinela dannoniensis*<sup>1</sup>) have been found on the Mackerel at Megavissey; all I have noticed or heard of have, except in one instance, been taken from near the pectoral fins; the one excepted was imbedded in a wound near the vent of the fish. These 'Lice,' as our fishermen call them, visit our coasts in countless millions in the spring months of the year; they seldom come nearer than 3 miles from the shore, and remain on the sea-bottom. Sea-Bream eat them readily."

In the 'Field' (August 9th) is an account of another Isopod, *Æga tridens*, and its carnivorous propensities. It is there stated, by both Mr. Tudor and Mr. Anderson, that in Shetland they attack the fish caught on the long lines, when laid on certain sandy bottoms or grounds, and, getting in through the gills, it is supposed, eat up the inside of the fish without destroying the skin or bone, so that

<sup>1</sup> Mr. Miers has kindly identified the species.



when the fish is hauled up it looks as plump and round as a live fish, but when opened is found full of these parasites.

Mr. Dunn subsequently (Sept. 29th) observes, "the statement in the 'Field' is quite in keeping with our knowledge of these fish-lice. We have no deep-sea long lines in use here; our deep-sea fishing is done with hand-lines; consequently we have no opportunity of testing the habits of the 'lice' in a like manner with the northern fishermen. But it often happens when a half Mackerel is used as a bait that the lice will in a few minutes scoop out all the fish, leaving nothing but the skeleton and the skin. To a novice, the bait will appear as round and full as when first cast into the sea, so closely packed are the lice in the body, but a hard rap against the side of the boat reveals the secret. They give out a ticking sound when crawling."

#### ZEUS FABER, Linn. John Dory or Doree.

I obtained two from the stationary shrimp-nets. This fish has numerous yellow lines taking an irregular horizontal direction along the body, a very light edging to the black lateral blotch, and two darkish lines along both dorsal and anal fins. At the Westminster Aquarium these fish are fed upon Sand-Smelts; and one day, being perhaps more hungry than usual, a Dory was observed to seize a young Bass, which it subsequently devoured. Mr. Saville Kent drew attention to the peculiar manner in which this fish uses its fins, which he, with great justice, likens to that of the dorsal fin in the Pipe-fish, a movement that Dr. J. E. Gray considered resembled the action of the Archimedean screw. This rapid motion affects the soft rays and interradial membrane of the dorsal, anal, and pectoral fins, all, or merely some, of which may be in motion at the same time. This may be perceived both when they are ascending or descending, or even when lying over on one side; but they are likewise able to move their fins more slowly, as we generally perceive in fishes.

The Dory appears to have been more common this year than usual. Turning to Lord Ducie's captures, I find them in Ballinskellig Bay as follows:—1873, one; 1874, four; 1876, five; 1877, four; 1878, five; 1879, twenty-seven.

#### CAPROS APER, Linn. The Boar-fish.

An example,  $5\frac{1}{4}$  inches in length, is in the Weston Museum; it was brought there alive. Large numbers have been captured this year off the English coast; and Mr. Carrington observes that he has received notices, during June 1879, of their having been taken in various parts of the south and south-east coast of England. At Weymouth and Bournemouth they were not infrequently found dead on the shore. At Sheerness a shrimp-trawler took a dozen at one draught; off Harwich a pair were similarly captured. The Essex fishermen term them 'Red Dorees,' but do not remember observing them in previous years. In the commencement of September, about a dozen were captured in one day on the south coast. Mr. Dunn sent me a fine example from Megavissey, November this year. On

examining it, I found three caecal appendages, whereas this fish is usually stated only to possess two.

*XIPHIAS GLADIUS*, Linn. The Sword-fish.

The cast of an example exists in the Weston Museum, taken by Mr. Mable from a specimen 9 feet long, which was captured near the town, at Burnham, in the summer of 1873. Its snout and fins are likewise preserved. On its left side, opposite the hind edge of the first anal fin, existed a large cicatrix, evidently due to a wound, which had nearly transfixed the fish, there being a spot on the opposite side showing to where the injury had extended. It does not seem improbable that this wound may have been inflicted by another individual of the same species. In the daily newspapers the capture of one of these fish in the Wye, on October 9th, is announced. It strayed up during the night, and was left stranded at Chepstow on the ebb making. Length 8 feet 6 inches; snout 3 feet long; weight 200 lb.

I was particularly desirous of examining the Gobies of Weston, as Couch has figured and described several supposed new species or Mediterranean forms from that locality. Every ichthyologist will admit the difficulty of solving questions of species, especially among Gobies, when the author omits to mention the number of the fin-rays, makes no remarks on the scales or teeth, while the size of the published figures does not accord with that of the specimen as described in the text. Finding myself completely at a loss, I determined to collect these fishes at Weston, whence the *Yellow Goby*, the *One-spotted Goby*, the *Speckled Goby*, the *Transparent Goby*, and the *Slender Goby* had been obtained. While demurring to the value of some of these species, it must not be overlooked that in the following identifications of Couch's text and plates I have had to be guided very considerably by colour and form, while, on the other hand, our examples came from the same locality.

*GOBIOUS MINUTUS*, Gmel., Linn.; Donovan, pl. xxxviii.; Yarrell; Parnell.

This species was very numerous; some examples agreed with *G. unipunctatus*, Parnell, and *One-spotted Goby*, Couch, and probably *G. gracilis*, Jenyns; while the *Tail-spotted Goby* of Couch is perhaps the young.

*GOBIOUS RUTHENSARREI*, Euph.

Not uncommon. Couch's *Two-spotted Goby* is this species, while his *Broad-finned Goby* may be the male.

*GOBIOUS RHODOPTERUS*, Günther.

Not rare. It is identical with *G. minutus*, Couch, and *G. gracilis*, Parnell and Yarrell (not Jenyns). The female differs considerably in colour from the male, while its fins are lower. It appears to be the *Yellow Goby* of Couch, not of Risso.

Couch gives a *Transparent Goby* and a *Slender Goby*, which may be examples of *Latrunculus albus*, a fish he considered "as the young of some better known species."

CALLIONYMUS LYRA, Linn. *C. dracunculus*, Linn. (female). The Dragonet, Gemmous and Sordid Dragonets.

This fish is taken off Weston, but only the male exists in the Museum. Mr. Sandford, to whom I am indebted for assistance in my investigations at the excellent Taunton Museum, informs me that the Skulpin is very good eating.

CYCLOPTERUS LUMPUS, Linn. Lump-sucker.

This fish is said to arrive in the cold months, and commits considerable havoc among the sprats.

"Watching a Lump-sucker firmly attached to the glass of the tank, the idea occurred to me that the sucker may have been developed by natural selection, as a useful adjunct to the breathing movements of the fish. When fixed, the fish appears to be perfectly at ease, and to breathe more fully and strongly than when swimming. The movements of the opercles or gill-covers, when the fish was attached, were specially strong, as compared with their motion in the act of swimming. In a large-headed and heavy-bodied fish, like *Cyclopterus*, any aid given to the respiratory movements would be a clear gain to the animal; and from a habit of simply resting on a object, so as to afford leverage and play to the gills, the comparatively useless ventral fins may have become specially modified as a disk of attachment; the development of the sucking-disk, and enlargement of the branchial cavity, would thus proceed *pari passu*, and by natural selection the present exaggerated features of both organs would be attained." (A. Wilson, 'Nature,' June 26, 1879, p. 197.) I would suggest that this modification of the ventral fins into a sucker (as we observe the first dorsal similarly modified in *Echeneis*) is principally for adhesion, either to prevent their being carried away by the tide, or to attach themselves to their prey. A heavy body, as a Lump-sucker, violently rolled over by a strong wave, would be liable to suffer considerable injury. As a proof of this I would refer to Dr. McIntosh, who observes that after storms these fishes are found on the west sands of St. Andrews.

LIPARIS VULGARIS, Flem. Sea-Snail.

Small examples I found exceedingly common at Weston, several being almost invariably present in every shrimp-net, while the crabs appeared to be uncommonly fond of them, few being uninjured. In none could I see any blue lines. Large examples are said to be common in the winter.

LIPARIS MONTAGUI, Donovan.

Has been recorded from Somersetshire.

LOPHIUS PISCATORIUS, Linn. Angler; Fishing-Frog.

Every two or three years a large one is taken at Weston. The

cast of one 4 feet long is in the Museum, as well as the jaws of two or three adults.

*CEPOLA RUBESCENS*, Linn. The Band-fish.

Somersetshire (*Baker*).

A specimen from Exmouth, captured this year and given me by Frank Buckland, Esq., was infested with worms, which Mr. Cobbold found to be examples of Rudolphi's so-called *Nematoideum cepolæ-rubescens*. Six different internal parasites have been described from this fish.

*BLENNIUS GATTORUGINE*, Bloch.

Local examples of this Blenny are in the Museum.

*ATHERINA PRESBYTER*, Cuv. Sand-Smelt.

*MUGIL CAPITO*, Cuv. The Grey Mullet.

I saw an example nearly three feet long, taken out of the flounder-stakes, they are said not to be commonly seen, but occasionally small schools of them are captured in the stationary shrimp-nets. At the Westminster Aquarium, those in the same tank as the Sturgeon greedily devoured lob-worms; their food is chopped mussels.

*MUGIL SEPTENTRIONALIS*, Günther. *M. chelo*, Yarrell.

Has been recorded from Somersetshire.

*GASTEROSTEUS ACULEATUS*, Will. The Tinker.

I obtained an example from the stationary shrimp-nets, others likewise exist in the Museum. Baker records the following varieties as found in the county:—*G. trachurus*, C. & V.; *G. semiar-matus*, C. & V.; *G. leiurus*, C. & V., or *G. gymnaurus*, Cuv. Although these Sticklebacks (or Pricklebacks, as they were formerly called) are taken in both fresh and sea water, Mr. Mable found that in an aquarium they rarely lived in salt water upwards of six weeks, and even then they did not thrive. Having obtained upwards of a score, he placed them in a freshwater aquarium, which was apparently too small for all to live in together with comfort; consequently some of the weaker were eaten by the stronger and larger ones. This could not have been due to want of food, as they had as much as they wished for; what they especially seemed to relish was butter, to obtain which they would even spring out of the water. They became exceedingly tame, and were fed with dried beef shredded, which they would take from the hand, but preferred Mrs. Mable to any one else; in fact she had only to hold a finger over the aquarium, and they would at once come and follow it as she moved it along. Some of the most brilliant males took and retained particular stations, and from which they drove away interlopers. They constructed nests of small bits of twigs, which they carried in their mouth like birds to the place where they desired to form their domicile, which was invariably laid on a sandy foundation. As soon as a piece of stick or other substance had been deposited, the fish carried some

sand in its mouth and strewed it above; then taking in some more sand, it went a short distance off and blew it over the structure, thus causing it to be diffused in a shower of bubbles. The nest when completed had its entrance on one side and its exit on the other, as has been described by Dr. Ransom and other observers; this nest, if lifted out of the aquarium, appeared to be glued together by a jelly-like substance. Mr. Warrington (Ann. & Mag. Nat. Hist. 1855, (2) xvi. p. 330) remarks that the adult die when they have propagated their species.

Some Roach, *Leuciscus rutilus*, were added to the inmates of the aquarium, with which invasion the Sticklebacks did not appear to be pleased; still they were not frightened, but forthwith attacked the intruders, biting at them anywhere and everywhere, until they became thoroughly cowed. Then these little tyrants were observed to place themselves in front of the Roach, steady themselves by their tail, and then suddenly dart straight at the lips of their intended prey, from which they bit pieces out. These attacks were continued until the Roach had been killed, when they were eaten by their conquerors.

*GATEROSTEUS SPINACHIA*, Linn. Fifteen-spined Stickleback.

A local specimen exists in the Weston Museum.

*LABRUS MACULATUS*, Bloch. The Ballan Wrasse.

Two local examples exist in the Weston Museum; they were received alive.

*LABRUS MIXTUS*, Fries, the Cook; *LABRUS COMBER*, Pennant; *CRENILABRUS MELOPS*, Linn., the Corkwing; *GYMNELIS IMBERBIS*, Linn., the Beardless Ophidium. Have all been taken in Somersetshire.

*AMMODYTES LANCEOLATUS*, Le Sauvage. The Greater Sand-Eel or Sand-Launce.

Baker reports this species from Somersetshire. In examining a very fine example received from Mr. Dunn, I find the œsophagus enters abruptly into a pyriform stomach, which has a very narrow prolongation from its posterior or larger end, longer than the remainder of the organ; the pylorus is also very narrow, and where it enters the small intestines that canal is prolonged upwards into a cæcal sac, while the length of the remainder of the tube scarcely exceeds half the length of the stomach.

*AMMODYTES TOBIANUS*, Linn. Lesser Sand-Eel.

Found at Weston.

*MORRHUA VULGARIS*, Flem. Codfish.

Taken during the winter months on lines; as is also *MORRHUA ÆGLEFINUS*, or the Haddock; *M. MERLANGUS*, Linn., or the Whiting, numbers of the young of which are captured in the shrimp-nets; and *MORRHUA LUSCA*, Linn., or the Bib.

*GADUS POLLACHIUS*, Linn., the Pollack, and *MERLUCCIVS VULGARIS*, or the Hake, are also occasionally taken in the Trammel during the winter months.

*PHYCIS BLENNOIDES*, Brunn., or the Forked Hake; *MOLVA VULGARIS*, Flem., or the Ling; *MOTELLA MUSTELA*, Linn., Five-bearded Rockling; *M. TRICIRRATA*, Bl., Three-bearded Rockling; *RANICEPS TRIFURCATUS*, Flem., Trifurcated Hake. Have all been captured in Somersetshire.

*RHOMBUS MAXIMUS*, Linn. The Turbot.

A few are captured off Weston; one weighed 16 lb. The following memoranda from Lord Ducie's observations on this fish, as taken in Ballinskellig Bay, are very suggestive as to the growth of the Turbot:—

In the year 1877 the average weight (excluding the three largest fish, as was done also in 1878 and 1879) was 2 lb., a few were an ounce or two above or below that weight. In the two succeeding years, captured at the same place and time, they were as follows:—

1878.			1879.		
No. of fish.	Weight.		No. of fish.	Weight.	
	lb.	oz.		lb.	oz.
...	...	...	1	1	...
4	1	8	...	...	...
...	...	...	3	1	4
...	...	...	2	1	8
2	1	12	1	1	12
2	2	...	7	2	...
...	...	...	1	2	8
1	2	10	...	...	...
1	2	12	...	...	...
18	3	...	9	3	...
2	3	4	2	3	4
9	3	8	1	3	8
...	...	...	3	3	12
1	3	14	...	...	...
1	4	...	3	4	...
1	4	4	3	4	4
...	...	...	2	4	8
...	...	...	1	4	12
...	...	...	3	5	...
...	...	...	3	5	4
...	...	...	1	5	8
...	...	...	2	5	12
...	...	...	2	6	...
...	...	...	1	6	4
...	...	...	1	6	12
1	7	...	2	7	...

If we analyze the foregoing figures we find the captures in the three years as follows:—

Weight:—	1-2 lb.	2-3 lb.	3-4 lb.	4-5 lb.	5-6 lb.	6-7 lb.	
1877 ..	111	4	..	..	..	..	or 115 fish.
1878 ..	8	20	12	2	..	1	or 43 „
1879 ..	6	8	18	9	8	4	or 53 „

The general average of the weight of the captures increased from 2 lb. in 1877, to 3 lb. in 1878, and 3 lb. 11 oz. in 1879; and an examination of the figures leads to the belief that the broods were much more numerous in the first than in the second or third year; while the small size of those taken in 1877 would also seem to infer the absence of large Turbot in Ballinskellig Bay at that time. In 1878 the figures apparently show that the increase in weight of the fish had been from  $\frac{1}{2}$  to  $2\frac{1}{2}$  lb. each fish, the highest numbers being among examples from 2 to 4 lb., instead of from 1 to 2 lb. But in 1879 we again find a change, the highest numbers captured being among those weighing from 3 to 5 lb. each, which would seem to confirm the conclusions demonstrable from the figures in the preceding years.

*RHOMBUS LÆVIS*, Linn. The Brill.

Is occasionally taken at Weston.

*RHOMBUS MEGASTOMA*, Donovan. The Whiff, or Mary Sole.  
*RHOMBUS PUNCTATUS*, Bloch. "Muller's Topknot."

These fishes are both found in Devonshire; the latter frequently in the spring months. In Ballinskellig Bay this year Lord Ducie took Whiffs between the middle and end of July, but none in the succeeding month.

*ARNOGLOSSUS LATERNA*, Walb. The Scald-fish.

Somersetshire (*Baker*).

*PLEURONECTES PLATESSA*, Linn. The Plaice. *P. LIMANDA*, Linn. The Dab. *PLEURONECTES MICROCEPHALUS*, Donovan. The Smear Dab.

*PLEURONECTES ELONGATUS*, Yarrell. (Plate LXI.)

The talented author of the 'British Fishes' received an example from Stolford in Somersetshire, where Mr. Baker obtained two specimens; and Mr. Higgins (Zoologist, 1861, p. 7317) records two more from Weston, which he gave to Mr. Couch. It is with much pleasure that I have to record my thanks to that excellent observer Mr. Matthias Dunn, of Megavissey, in Cornwall, for a fine example, about 9 inches long, taken in 30 fathoms water by a trawler, almost two miles from the Deadman, Cornwall, November 6th, 1879, and which I received on the 10th.

B. v., D. 115, P. 12, V. 6, A. 97, C. 19, L. 1. 115.

Length of head  $6\frac{1}{2}$ , of caudal fin  $6\frac{1}{2}$ , height of body  $3\frac{1}{4}$  in the total length. *Eyes* on the right side, and separated from each other by a very narrow scaleless ridge, which is continued almost to the origin of the lateral line; lower eye one third in advance of the upper. Lower jaw slightly the longer anteriorly, and has a tubercle below the symphysis. Maxilla two thirds as long as the orbit, and extending to beneath the front edge of the lower eye. Body very thin, its greatest thickness equalling one sixth of its greatest height, excluding the vertical fins. *Teeth* in a single row, compressed, with

their crowns somewhat obtuse; teeth most developed on the blind side. *Fins.* Dorsal commences over the middle of the upper eye, its longest rays being in its middle, where they are three fifths of the length of the head; posteriorly the fin terminates almost close to the root of the caudal fin, which latter is wedge-shaped. Anal similar to dorsal, but its middle rays not so elongated. Both pectorals with twelve rays, the left half as long as the head, the right one fourth longer than the left. Ventrals each with six rays, and one half as long as the pectoral. *Scales* cycloid on left, feebly ctenoid on the right side, *none over the fin-rays* except on the caudal. *Lateral line* with very slightly oblique descent above the pectoral fin, whence it proceeds direct to centre of the caudal. *Gill-rakers* short, spinate, and widely separated. *Cæcal appendages* two, moderately developed. *Colours:* right side brown, with a slaty tinge, darkest about the head; a black blotch on the upper half of the pectoral fin; vertical fins of a greyish slate-colour, the anterior dorsal rays being tipped with white; left side white.

*Habitat.* A single example 9 inches long, from Megavissey, Cornwall, obtained and recognized by Mr. Matthias Dunn. Yarrell's example, a dried skin, had probably shrunk, causing it to appear more elongated than is natural. It is more closely allied to *P. cynoglossus*.

#### PLEURONECTES FLEUS, Linn. The Flounder.

Reversed examples were exceedingly numerous, and in one instance I saw a Flounder coloured on both sides. I would here draw especial attention to four abnormally coloured Plaice and Flounders in the Westminster Aquarium, all of which are white on the under-side; the eyes are normal; while the albinism I am about to describe has existed from the time they were received, neither increasing nor diminishing. In one (1) the dorsal and anal fins are white to a great extent, but in rather an irregular manner; (2) the dorsal and anal fins are similar to no. 1, but the white has extended onto the sides of the body; (3) the white is rather more spread than in no. 2; (4) the caudal fin and most of the posterior half of the body are nearly white, whereas the anterior portion of the body is mottled. If, as suggested by A. Agassiz, the colours of these fish are affected owing to the eye, on what will eventually be the uncoloured side, passing over to the upper surface, leaving the eyeless side colourless, due to the controlling power of the nerve having become unable to act over the colour-cells, how, one would suggest, can this albinism be present in examples wherein both eyes are present on the dark side thus affected?

#### SOLEA VULGARIS, Quensel. The Sole.

Small ones were common in the shrimp-nets at Weston; and Mr. Mable writes me word from Weston (Sept. 13) that, "during the last few days, a large quantity of very fine Soles have been taken here. On inquiry I find they were caught about 30 miles down the Channel by two trawls from Cardiff; the gross weight was 10 tons, and the heaviest



pair 8 lbs. This is a new fishing-ground, having only been tried about 6 months. Numbers of other fish have been taken, and recently a Sturgeon. The waters close here cannot be trawled, because cod-lines have been in use for about the last hundred years, and every time one is sunk a large stone or two is let down with it; consequently the sea-bottom is studded with this kind of thing."

*SOLEA VARIEGATA*, DONOV., Variegated Sole; *SOLEA VULGARIS*, Günther, the Lemon Sole; *SOLEA MINUTA*, Parnell, the Little Sole. Have all been recorded from Somersetshire.

*MAUROLICUS BOREALIS*, Nilss. The Argentine.

Seven examples taken at Weston by Higgins.

*SALMO SALAR*, Linn. The Salmon.

Occasionally an example gets into one of the stationary shrimp-nets in passing from the sea to the rivers or *vice versa*. It may be observed in this place that the authorities of the Brighton Aquarium have now conclusively demonstrated, what has long been known to every ichthyologist, that the Parr is the young Salmon. Mr. Francis Francis observes in the 'Field' (August 2, 1879) that Mr. Berrington sent from the Usk "a beautiful consignment of small Parr, to the number of about twenty, about six or eight months ago, more than three fourths of which are still alive. They were placed in fresh water, and soon began to feed and take to their tank. From that time not one has died; towards May, most of them began to assume the Smolt stage. I think there were only four which failed to do so, all the rest became veritable Smolts; the four remained definite Parr. Then arose the question what were we to do; should we take out the Parr and leave the Smolts; and then introduce salt water gradually? \* \* We therefore thought we would sacrifice the four Parr, if it were necessary, as the belief formerly prevailed that to introduce Parr into salt water before they assumed the Smolt stage was certain death to them." He continued that salt water was gradually introduced; the Smolts became rampant with pleasure while the Parr did not die. At last no fresh water remained in the tank; it was entirely marine. "Then the Parrs which had remained Parrs up to that time began to assume the Smolt stage, and now every one are brilliant active Smolt, miniature Salmon in fact, and as different fish from the duller and more inactive Parr as one could conceive."

*BELONE VULGARIS*, Flemm. The Gar-fish or Gar-pike.

Is occasionally taken off Weston.

*SCOMBERESOX SAURUS*, Walb.

The Skipper has been taken in Somersetshire. Mr. Dunn sent me a good example, 11 inches long, in September this year, which he observes "sprang into a fisherman's boat at midnight. I have known nearly a dozen similar instances."

*EXOCETUS EVOLANS*, Linn. The Flying Fish.

Somersetshire.

*ENGRAULIS ENCRASICHOLUS*, Linn. The Anchovy.

Occasionally taken in the shrimp-nets. Those at the mouth of the Parret are said to be very superior.

*CLUPEA HARENGUS*, Linn. The Herring; Whitebait (in part).

I obtained several small examples of this fish from the stationary shrimp-nets; but "Whitebait" is not taken to such an extent as to be an article of consequence as food. I will here refer to some investigations which I made during the last two seasons, respecting *what Whitebait is*. In May 1878 I commenced collecting examples, excluding other fishes as Gobies and Sticklebacks, a very few of which accidentally or fraudulently are found mixed with the true forms, restricting my observations to what are the species known by this name in London, to the trade, and to epicures. My collections were continued until the end of October, all the examples coming from the Thames. Mr. Charles, the Belgravian fishmonger, kindly procured me examples from the Medway during January and March this year, and subsequently I have reverted to Billingsgate for my supply. I examined 138 of these fish taken during May and June 1878, the longest of which was 2·5 inches: about 1 in 10 were Sprats, the remainder the young of the Herring. In August, out of 46 examples, from 2 to 3·5 inches in length, 24 (from 2 to 2·7 inches long) were Sprats, and 21 (from 2·8 to 3·5 inches long) were young Herrings. In October, out of 41, from 2·5 to 3·5 inches long, all were Herrings. It thus appears that both Sprats and young Herrings find their way into the London market as Whitebait. Out of 31 examples of winter Whitebait received from Mr. Charles, 26 varied from 2 to 4·5 inches in length, the larger ones having well developed roe, all were Sprats; the remaining 5 were young Herrings from 5 to 7·5 inches long, the largest possessing slightly developed roe.

That Pennant's drawing was the Whitebait of the present time there can be but little doubt, as well as that his examples were young Herrings. It is also certain that Donovan's figure is that of a young Shad, the immature of which, if sufficiently numerous, would do as well as those of the Herring or of the Sprat; while I certainly possess the young of these last two forms which I have received as Whitebait.

*CLUPEA ALOSA*, Cuv. The Shad or Allis Shad.*CLUPEA FINTA*, Cuv. The Twaite Shad.

A good local example exists in the Weston Museum. At the commencement of June these fish were common in the Severn near Gloucester, while their ova was ripe. They used to ascend far above Shrewsbury, and many were captured on the fords in the river Severn; but for years none have been seen, probably owing to the weirs on that river and their being unable to ascend the fish-passes; while for the

last few seasons I understand that they have greatly decreased in numbers in the Wye. As the floods at the earlier part of this year entirely precluded their capture at the mouth of the latter river, it is to be presumed that there will be an augmented supply in May and June 1880, should the season be favourable for fishing.

*CLUPEA PILCHARDUS*, Walb. The Pilchard. (Plate LXII. fig. 1.)

A few stragglers are said occasionally to be taken off Weston. Observing a great diversity in the various descriptions of this fish, I applied to Mr. Dunn of Megavissey, who kindly forwarded me about a dozen, one half of which were spotted along the sides, the remainder being spotless. The following are the various formularies given for this fish:—

Donovan. D. 18, P. 16, V. 8, A. 17, C. 32. (L. 1. shown as distinct in figure, with about 31 scales.)

Yarrell. B. viii. D. 18, P. 16, V. 8, A. 18, C. 19. Scales "very large."

Cuv. & Val. D. 17, P. 17, V. 6, A. 21, C. 18, L. 1. 29. Cæc. pyl. innumerable.

Couch. D. 18, P. 16, V. 8, C. 22, L. 1. (about 37 in figure).

Günther. B. vi. D. 17-18, V. 6, A. 18-19, L. 1. 47-48. Cæc. pyl. 7.

Thus the number of scales along the body in this fish vary according to different authors from 29 to 48; the ventral fin rays from 6 to 8, and the cæcal appendages between "seven" and "innumerable." Taking some fine examples of Pilchards sent to me by Mr. Matthias Dunn, I found them as follows:—

D. 18, P. 19, V. 8, A. 17-18, C. 19, L. 1. 29-30, L. tr. 9.

Cæc. pyl. numerous. From 17 to 19 scutes before the base of the ventral fin, and 14 posterior to it. The proportions being shown in the figure (Plate LXII.), it is unnecessary to advert to them. The cæcal appendages were very numerous, and much shorter in some examples than in others. The sole British *Clupea* that I have met with having only 7 appendages is *C. sprattus*, which, however, has 47-48 scales along the lateral line. Therefore I cannot think that *Clupea sugax*, Jenyns, from the Pacific coast of America, Japan, and New Zealand, is "so closely allied to the European Pilchard that it might be more properly described as a climatal variety" (Günther, Catal. vii. p. 444); for though the number of dorsal and anal fin-rays is the same, instead of having L. 1. 29-30, L. tr. 9, it has L. 1. 50-54, L. tr. 13—a conclusive proof that the two ought not to be classed as varieties of one species. However, I think I am now in a position to explain this remarkable discrepancy in the number of scales as given by various authors. I received a scaleless (but otherwise beautiful) example of Pilchard, 8.3 inches in length, from Mr. Dunn,

which apparently had L. l. 53; and I have since examined at the British Museum similar specimens giving the appearance of having had from 48 to 51 scales along the body. I therefore scaled a specimen having L. l. 29; and to my surprise I found marks of the adhesion of what appeared to have been 53 scales. In fact, when the fishes have been denuded of their covering, they give the remarkable phenomenon of appearing to have had about twice the number of scales which they really possessed.

Some of these Pilchards had spots along the sides, others had none, the marks being largest in those destitute of scales. Mr. Dunn observed that "often one in five among thousands are thus spotted. The great difference I have found in the varieties is that the scales are less firm in the spotted fish than in the plain ones \* \* \* I think there can be no doubt that strong and healthy Pilchards spawn twice in the year, in December and June; their roe floats on the surface of the sea. I have seen the roe passing from these fishes when alive, and have allowed it to drop in a bucket of water, and observed each globule separate and start along the water, and finally hang just beneath the surface. Pilchards seldom spawn nearer than 10 miles from land, usually from 20 to 30 miles-off; they are more plentiful in the English Channel than most people are aware of. My brother was on board of a fishing boat in 1877, midway between Ramsgate and France, fishing for Mackerel. About the 20th Sept. the sea appeared full of fish; on the nets being employed, they turned out to be Pilchards of a very fine size. Besides the spotted variety, there is one with a white ring in its eye, another black-eyed; but this may be due to age."

CLUPEA SPRATTUS, Linn. The Sprat. (Plate LXII. fig. 2.)

This fish comes into Weston in large numbers about October, when it is followed by many predaceous forms. I rarely, however, visited the fishing-stakes in July or August without finding a few examples. Baker observes that these fish "suspended in lines in cottage-kitchens are seen for months after the fishing-season is over."

ANGUILLA VULGARIS, Turton. Common Eel.

Both *A. acutirostris*, Risso, and *A. latirostris*, Risso, have been recorded from Somersetshire. These and several other fishes are said to have largely decreased in numbers of late years—attributed by some to the increased impurity of the water, by others to the destruction of the Elvers or young Eels. I obtained several Eels from the stationary fishing-nets: they were termed "Silver Eels," owing to their colour and in contradistinction to the "Golden Eels," or those from the muddy waters of the Severn or Avon. Without discussing the question of how to distinguish the various British Eels, I must here refer to Hastings (Illust. Nat. Hist. of Worcestershire, 1834, p. 135), who observes "there are two distinct kinds of Eel in the Avon, the silver and the yellow Eel; there is likewise another

description, but which I have never seen, called frog-mouthed Eel by the fishermen, from the extraordinary width of its mouth." In August I received two Eels, each 3 feet long, from the Severn, taken on the same day: the head of one is most curiously flattened, probably due to some injury received in its early development; but the fishermen asserted that this example is one of the third variety, probably identical with that termed frog-mouthed Eel by Hastings. Its snout is very broad, lips comparatively thin, and the angle of the mouth below the hind margin of the eye.

CONGER VULGARIS, Cuvier. The Conger Eel.

Small ones are common at Weston; and many are captured by lads from under stones, where they have sought shelter as the tide ebbed.

SIPHONOSTOMA TYPHLE, Linn. The Broad-nosed Pipefish.

SYNGNATHUS ACUS. The Great Pipefish.

NEROPHIS ÆQUOREUS. The Ocean Pipefish.

These fishes have all been recorded from Somersetshire.

TETRODON LAGOCEPHALUS, Linn., or T. PENNANTII, Yarrell.

Rather a fine stuffed example, 15 inches long, exists in the Weston Museum. It was purchased from a local bird- and animal-preserver, so is probably a local specimen; but no history is obtainable. If we turn to the records of where this fish has been taken in Great Britain, we find that the British Museum possesses an example from Charmouth in Dorsetshire; one is recorded from Waterford in Mag. Nat. Hist. 1837, a second in the 'Zoologist' for 1853, and a third Irish example at Wexford in 1850; two are recorded from the Orkneys in the 'Zoologist' for 1853, while many have been taken in Cornwall. Consequently the capture of one in Somersetshire would be no peculiar circumstance.

ORTHAGORISCUS TRUNCATUS, Linn. Oblong Diodon.

Has been captured in Somersetshire.

ORTHAGORISCUS MOLA, Bl. Schneider. The Sunfish.

This is said to have been seen off Somersetshire. During the last season, Lord Ducie (August 13th) saw one of these fish in Ballinskellig Bay. I give the following summary from some interesting observations which his Lordship made during a previous season.

There is no locality in the United Kingdom where the Shorter Sunfish, *Orthagoriscus mola*, is more frequently seen than off the south-west coast of Ireland; and Lord Ducie remarks that he has frequently fallen in with them all along the coast from Dungarvan to Valencia. August 1877, a boat's crew from his lordship's yacht returning from long lining fell in with a large one lying on the surface in its usual lazy fashion, the projecting caudal fin describing the segment of a circle in the air, as the unwieldy body rolled with every



heave of the sea. Having rowed up to the fish, they found his skin too tough to permit them to fix the conger-gaff in him; and their attempts seemed to occasion him neither discomfort nor alarm. Next they succeeded in introducing the gaff into his mouth; he struggled violently for a few minutes, got his head down, and with one wrench escaped, bearing the gaff away with him.

Thinking that a similar opportunity might again occur, a large hook was fastened to a stick, a lanyard being securely affixed to the hook, and "stopped" along the stick; to a hook at the end of the lanyard a strong line could be attached when necessary. No opportunity occurred of testing this implement until July 31st, 1878, when, just as Lord Ducie was about to shoot an Otter-trawl from his fishing-cutter (a boat of 30 tons), a Sunfish was seen close alongside in about 6 fathoms of water. Going up to it in a dinghy rowed by one man, this fish allowed them to approach quite close. It lay on one side, blowing a stream of water out of its mouth, and vacuously rolling its eyes without showing alarm, although only about one yard distant. Now the hook was fixed into its mouth: for three or two seconds it remained motionless, and then with one plunge dived down. Some few fathoms of line from the 50-fathom reel had fortunately been uncoiled; yet for a few moments it appeared as if the fish would prove the more powerful, and carry away reel and all. One turn of the line was got round the stern of the boat, which the fish now dragged through the water for some 200 yards; but from time to time striking the sandy bottom of the shallow bay, it came to the surface, plunging down again with gradually failing strength. It was secured after about half an hour's chase, and took six men to haul it above high-water mark. Length 6 feet 3 inches; depth 3 feet 2 inches; distance from fin to fin, taking the extreme points, 7 feet 5 inches. Two more were subsequently captured in a similar way.

*ACIPENSER STURIO*, Linn. The Sturgeon.

Baker records both the common form and likewise the broad-snouted variety from Somersetshire. In the Weston Museum exist the remains of one which was taken in the stationary shrimp-nets. An example in my collection was kindly sent to me by Mr. Carrington; it lived in the Aquarium from May 1878 to July 1879. Originally captured off Margate, the fishermen fastened a line round its tail, and towed it thus at the stern of their vessel to the Thames. On arrival the rope was found to have cut almost to the backbone; so great was the injury, that the fish was at first refused. However, it so entirely recovered that scarcely a trace of the scar remains. While in the Aquarium it was fed on lob-worms.

*GALEUS CANIS*, Bonap. The Tope.

Weston.

*LAMNA CORNUBICA*. The Porbeagle or Beaumaris Shark.

An example 4 feet 3 inches in length was captured in the mid-

channel off Weston in 1871, while apparently lying asleep on the surface of the water, the fishermen being able to row up to it. A cast was taken by Mr. Mable. The skull was also preserved; the teeth are large, lanceolate, and have a well-developed cusp on either side of their base.

*SCYLLIUM CANICULA*, Linn. The Lesser Spotted Dogfish.

*ACANTHIAS VULGARIS*, Risso.

These fishes are neither uncommon, especially during the Sprat season.

*RAJA CLAVATA*, Linn. The Thornback

*RAJA BATIS*, Linn. The Common Skate.

These are both found at Weston, but usually as immature examples.

*PETROMYZON MARINUS*, Linn. The Lamprey or Sea Lamprey.

*P. FLUVIATILIS*. The River-Lamprey or Lampern.

Both are taken at Weston.

*P. BRANCHIALIS*, Linn. Small Lamprey.

Has likewise been recorded from Somersetshire by Baker.

#### EXPLANATION OF THE PLATES.

##### PLATE LXI.

*Pleuronectes elongatus*, p. 755.

##### PLATE LXII.

Fig. 1. *Clupea pilchardus*, p. 759.

1 a. Stomach and caecal appendages of ditto.

2. *Clupea sprattus*, p. 760.

2 a. Air-bladder, stomach, and caecal appendages of ditto.

December 16, 1879.

Prof. Flower, LL.D., F.R.S., President, in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the month of November 1879:—

The total number of registered additions to the Society's Menagerie during the month of November was 63, of which 4 were by birth, 16 by presentation, 22 by purchase, 13 were received on deposit, and 8 by exchange. The total number of departures during the same period, by death and removals, was 74.

The most noticeable addition during the month of November was as follows:—

A fine example of the King Penguin (*Aptenodytes pennanti*),

purchased November 14th. This bird was in the uniform brown down plumage of the first year when it arrived, but has now nearly thrown off that dress, and attained the ordinary feathering. It is said to have been captured at Staten Island, Tierra del Fuego.

Mr. T. Jeffery Parker read a paper on the Intestinal Spiral Valve in the genus *Raia*. Mr. Parker showed that there were four types of valves exhibited in individuals of that genus, differing from one another in morphological characters, in the extent of absorption-surface presented to the food, and in the resistance offered to the passage of food.

This paper will be printed entire in the Society's 'Transactions.'

Mr. Seebohm exhibited a small collection of birds made by Capt. the Hon. G. C. Napier in the valley of the Atreck river which flows into the Caspian Sea not far north of Asterabad, and forms the boundary line between Russia and Persia. The species were as follows:—

*Falco cenchris*, Cuv.

*Coracias garrulus*, Linn.

*Pratincola caprata*, Linn. [This species has not hitherto been found further west than Baluchistan, though it ranges eastward as far as the islands of the Malay archipelago.—H. S.]

*Emberiza luteola*, Lath. [Not hitherto found west of Turkestan.]

*Emberiza hortulana*, Linn. (♀).

*Hypolais caligata*, Licht.

*Cypselus melba* (Linn.). Shot on 12th April, flying in company with the Common Swift, at 3000 feet elevation.

*Pterocles alchata* (Linn.). Shot near Teheran, 26th September, at 4800 feet elevation.

*Glareola pratincola* (Linn.). Shot 10th May.

*Botaurus stellaris* (Linn.).

*Cedicnemus scolopax* (Gmel.). Shot 26th April at 3000 feet elevation.

*Plegadis falcinellus* (Linn.). Shot 26th May.

*Phalaropus hyperboreus*, Linn. Shot 25th May. [Doubtless on migration towards its breeding-grounds in the valley of the Petchora, where it arrives during the first or second week of June.—H. S.]

Mr. Sclater exhibited a small collection of birds from the island of Montserrat, West Indies, which had been prepared and kindly sent to him for examination by Mr. J. E. Sturge, of Plymouth, Montserrat.

As nothing was yet known of the ornithology of Montserrat, Mr. Sclater thought it desirable to record the names of the species.



somewhat shortened, wanting the terminal twist. From the examination of other specimens preserved by Mr. Garrod, and now in the Museum of the College of Surgeons, I may add that *Canis rutilans*, *C. primævus*, *C. cerdo*, *C. chama*, and *C. magellanicus* have all folded cæca; but differences can be observed in the length and mode of folding, both in them and in the species stated by Mr. Garrod to resemble *C. familiaris*, though without a larger series it is impossible to say whether some of these differences may not be due to individual peculiarity.

It is, however, clear that the form of the cæcum has nothing to do with a geographical division of Canidæ; nor is it, as far as is yet known, correlated with any other structural modification.

The female example of the very handsome and rare Red Wolf or Fox (*Canis jubatus*) from Buenos Ayres, which died lately, after a residence of two years in the Gardens, has enabled me to give a figure of the smallest (relatively to the size of the animal) and simplest form of cæcum yet observed in the group. It lies by the side of the ileum, without the slightest inclination to a curve in either direction. Its length is slightly less than three inches, and its greatest diameter one inch. From a contracted base it expands gradually to the middle, and continues of a cylindrical form to the termination in a conical apex.

There was no striking deviation from the ordinary canine type in any of the remaining viscera of this animal which were forwarded for my examination. The lobes and fissures of the liver agreed in all essentials with those of the common Dog. In the tongue the *lytta* (the absence of which in *Lycæon pictus* is noted by Garrod) was well developed<sup>1</sup>.

## 2. Second List of Mammals and Birds collected by Mr. Thomas Waters in Madagascar. By EDWARD BARTLETT, Curator of the Museum and Public Library, Maidstone.

[Received November 15, 1879.]

(Plate LXIII.)

Since my first paper<sup>2</sup> on the Mammals and Birds of Madagascar, I have received several small collections from Mr. T. Waters (who still continues his labours, and is now in South-east Betsileo country); and it affords me much pleasure to bring before the Society a list of those species which are not included in my former list.

Among the species I find one new and interesting Mammal belonging to the genus *Nesomys*, and two new species of birds of the following genera, viz. *Cypselus* and *Zapornia*, a description of which will be found under the genera which they represent.

<sup>1</sup> Since this note was communicated to the Society, Mr. Ockenden, the Professor's assistant, has shown me the cæcum of the type specimen of *Canis rudis*, Günther, from Demerara, which died in the Gardens in April last. Though not quite so small proportionally as in *C. jubatus*, it is also straight.

<sup>2</sup> P. Z. S. 1875, p. 62.

Up to the present I may mention that I have noticed 41 species of Mammals and 81 species of Birds, from Mr. Waters's collection in this district.

### MAMMALS.

1. LEMUR CATTAL, Linn.

Ekongo, S.W. coast of Madagascar.

Several specimens of males, females, and young.

They do not appear to vary much, except in the colour of the back, which is in some examples grey, and in others of a beautiful pinkish brown.

2. LEMUR RUFIFRONS, Geoffr.

Ekongo, S.W. coast of Madagascar.

One example.

3. LEMUR MONGOZ, Linn.

S.W. coast of Madagascar.

Examples of this species vary much in the colour of the tail, some having the tail bright reddish brown with whitish tips, while others have it of a pale yellowish brown.

4. LEMUR NIGRIFRONS, Geoffr.

S.W. coast of Madagascar.

5. LEMUR XANTHOMYSTAX, Gray.

S.W. coast of Madagascar.

6. HAPALEMUR SIMUS, Schl. & Pollen.

Ekongo and S.E. Betsileo, Madagascar.

Several examples of males and females. They vary very little in colour; and all those I have examined have the yellowish brown patch on the rump.

"They live in the bamboo forests, and feed on the young shoots of the bamboo."—*T. Waters*.

7. HAPALEMUR OLIVACEUS, Geoffr.

S.W. coast of Madagascar.

Called by the natives "Coaline."

8. CHIROGALEUS MILII, Geoffr.

Ekongo, Madagascar.

9. LEPILEMUR MUSTELINUS, Geoffr.

S.E. Betsileo, Madagascar.

Four specimens are in the present collection, which vary very much in colour:—

(1) Adult male: iron-grey, with yellowish brown tinge; tail uniform greyish brown.

(2) Adult female: crown pale grey; shoulders, back, and fore-

arms dark reddish brown; rump and hind legs pale greyish brown; tail blackish for half its length.

(3) Adult female: very bright rufous brown on all the upper parts, large dirty brown patch at base of tail or rump; tail brown for half its length, paler at the base.

(4) Young male, half-grown: colour the same as No. 2; the only important difference is a blackish patch behind the ear.

All the above specimens have a very characteristic yellowish white stripe, which runs from the cheek down the side of the neck, and nearly unites at the lower part of the back of the neck.

10. *MICRORHYNCHUS LANIGER*, Illiger.

S.W. coast of Madagascar.

Female and young, called by the natives "Ovandroo."

11. *PROPTHECUS VERREAUXII*, Grand.

S.E. Betsileo, Madagascar.

A young male: crown brownish black, which does not extend to the nape.

12. *PROPTHECUS HOLOMELAS*, Günth.

Ekongo, S.W. coast of Madagascar.

13. *PROPTHECUS EDWARDSI*, Grand.

Ekongo, S.W. coast of Madagascar.

In a former collection (from the above locality) I received a male, female, and young of this species. The young one appeared about three or four days old: the fur is long and rough; and the yellowish brown band across the loins (as in the adult) is very distinct.

14. *CYNOHYCTERIS STRAMINEA*, Geoff., var. *C. dupreana*, Poll

S.E. coast of Madagascar.

15. *MINIOPTERUS SCHREIBERSI*, Natt.

S.E. Betsileo, Madagascar.

16. *MINIOPTERUS SCOTINUS*, Sund.

Ekongo, Madagascar.

Called by the natives "Hepate."

17. *VESPERTILIO GOUDOTI*, Smith, var.

*V. madagascariensis*, Tomes.

S.W. coast of Madagascar.

18. *PHYLLORHINA COMMERSONI*, Geoffr.

S.E. Betsileo, Madagascar.

Mr. G. E. Dobson has kindly determined the above-mentioned species of Bats for me.

19. *FOSSA D'AUBENTONI*, Schreb.

S.W. coast of Madagascar.

Called by the natives "Tambosading."

20. *GALIDICTIS STRIATA*, Geoffr.

S.W. coast of Madagascar.

This species is described as having seven or nine longitudinal black streaks on the back; the specimens which I have received have only six streaks.

21. *EUPLERES GOUDOTII*, Doyère.

S.E. coast of Madagascar.

22. *NESOMYS BETSILEOENSIS*, sp. nov.

S.E. Betsileo, Madagascar.

Called by the natives "Volane andrivo."

Fur soft, abundant, and shining, reddish brown, tipped with black, base nearly black; underparts of body rufous, paler on the chin and throat; feet and tail sparingly covered with short pale-coloured hairs.

Length 7 inches; tail 3 inches.

This interesting Rodent closely resembles in general appearance our common Water-Vole (*Arvicola amphibius*), differing in being much smaller, in its richer tone of colour, the fur nearly black at the base, and the tail shorter.

## BIRDS.

1. *SCOPS RUTILUS*, Puch.

S.W. coast, and S.E. Betsileo, Madagascar.

Called by the natives "Forey-Foreeg."

Egg creamy white.

2. *CYPSELUS BALSTONI*, sp. nov.

S.W. interior Betsileo country, Madagascar.

Called by the natives "Fearilsandro."

Beak black; back, primaries, scapulars, tail, and belly very dark bronze-green, inclining to black, each feather more or less tipped with pale buff, these white tips being more distinct on the belly; top of head, throat, tertials, and secondaries pale dirty buff, palest on throat, tinged with pale bronze-green; under the chin a series of small elongated shaft-spots; under wing-coverts pale greyish buff, with very distinct elongated shaft-spots, tips nearly white; under-side of primaries and tail nearly black; under tail-coverts brownish, quills black; legs, toes, and claws blackish brown.

Length 6 inches; wing  $6\frac{1}{4}$  inches, wing beyond tail  $1\frac{3}{8}$  inch.

Having carefully compared this Swift with a number of skins of *Cypselus apus*, I feel convinced that it is distinct from that species, and I have no hesitation in describing it under the above name. It differs in size and colour, by having the small elongated spots on the throat and on the under wing-coverts. I have much pleasure in naming this species after Mr. R. J. Balston.

3. *ATELORNIS PITTOIDES*, Lafr.

S.E. Betsileo, Madagascar.

Eggs creamy white, with a smooth surface, but not so highly polished as the egg of *Coracias garrulus*.

## 4. CORYTHORNIS VINTSIOIDES, Eyd. et Gerv.

S.W. coast of Madagascar.

Egg pure white and polished.

## 5. UPUPA MARGINATA, Peters.

*Upupa madagascariensis*, Bp.

S.W. coast of Madagascar.

Eggs pale greyish blue, resembling those of *Upupa epops*, but rather larger.

## 6. COSSYPHA SHARPII,

S.E. Betsileo, Madagascar.

## 7. LEPTOPTERUS VIRIDIS, Müll.

S.E. Madagascar.

## 8. PHILEPITTA CASTANEA, Müll.

S.E. Betsileo, Madagascar.

## 9. NELICURVIUS NELICOUVI, Scop.

*Hyphantornis pensilis*, Gm.

S.E. Betsileo, Madagascar.

Eggs pale blue, about the same size as the egg of *Accentor modularis*.

## 10. SERICOSOMUS SERRIANUS, Puch.

S.E. interior of Madagascar.

Called by the natives "Fandaklanan."

## 11. SERICOSOMUS, sp. inc.

Ekongo, S.E. Madagascar.

Called by the natives "Fandaklanan."

♂. Upper mandible brownish black, tip reddish; base of lower mandible yellowish, tip red; crown of head, neck, centre of back, scapulars, upper wing-coverts, tertials, upper tail-coverts, and two centre tail-feathers light metallic bronze-green with a rich rufous tinge, each feather broadly tipped with darker rufous brown; rump, chin, neck, breast, belly, flanks, and vent slaty grey, slightly tinged with metallic-green and narrowly tipped with rufous, the rufous being most conspicuous on the breast; primaries and the remaining eight tail-feathers rich metallic-green with a slight rufous tinge, and tipped with the same colour; legs black. Length  $15\frac{1}{2}$  inches, wing 5, tarsus  $1\frac{3}{4}$ .

This is a young bird, probably of *Coua reynaudi*.

## 12. CUCULUS ROCHII, Hartl.

S.W. coast, and S.E. Betsileo, Madagascar.

Called by the natives "Kang-kappena."

13. *FUNINGUS MADAGASCARIENSIS*, L.

S.E. Madagascar.

Called by the natives "Firniga-muigu."

14. *CENA CAPENSIS*, L.

S.E. coast of Madagascar.

15. *MESITES VARIEGATUS*, Geoffr.

S.E. coast of Madagascar.

See remarks on the affinities of this genus, Proc. Zool. Soc. 1877, p. 291.

16. *ANASTOMUS LAMELLIGERUS*, Temm.

S.W. coast of Madagascar.

17. *GALLINAGO BERNIERI*, Puch.

S.E. Betsileo, Madagascar.

Male, female, and eggs are in the collection.

Egg pale brown, spotted and blotched with various tints of dark brown, principally at the large end, about the same size as the egg of *Gallinago major*.

18. *BIENSIS MADAGASCARIENSIS*, Verr.

S.E. Betsileo, Madagascar.

Male and female of this interesting Rail are in the collection.

This bird appears to me to belong to the genus *Rallus*; it resembles closely *R. aquaticus* and its allies.

19. *ZAPORNIA PYGMÆA*, Naum.*Zapornia baillonii*, V.

S.E. Betsileo, Madagascar.

Specimens of this species, with the eggs, are in the collection.

20. *ZAPORNIA WATERSI*, sp. nov. (Plate LXIII.)

S.E. Betsileo, Madagascar.

♂. Beak dark brown; top of head, neck, throat, and breast chestnut-brown, darker on top of the head, paler on the chin; centre of back, scapulars, and upper wing-coverts dark brown, each feather having an elongated black centre; primaries and secondaries dusky brown; upper tail-coverts, tail, and under tail-coverts dark chestnut-brown, tipped with black; belly, thighs, and vent dark slaty brown; legs, toes, and claws pale brown.

Length  $5\frac{1}{4}$  inches, wing  $2\frac{3}{4}$ .

♀. Beak dark brown; crown of head and neck dark brown, tinged with rufous, with very pale indistinct bars near the tips of each feather; back, scapulars, tertials, and upper wing-coverts dark brown, the centre of each feather blackish, with from four to six whitish spots and bars on the outer edges of the webs of each feather; primaries dusky black, with two or three very indistinct whitish spots on the outer web of the first and second quill-feathers; upper tail-coverts, tail, and lower tail-coverts chestnut-brown, barred with black

and white; throat, cheeks, breast, and belly dirty white, tipped with very pale brown; sides, flanks, and vent greyish brown, barred and spotted with white; legs, toes, and claws pale brown.

Length  $5\frac{1}{4}$  inches, wing  $2\frac{3}{4}$ .

This interesting little Rail I submitted to Mr. R. B. Sharpe, who kindly pronounced it to be a new species; therefore I have much pleasure in naming it after the collector, Mr. T. Waters.

21. *PODICEPS PELZELNI*, Hartl.

S.W. interior of Madagascar.

22. *FULMARUS GIGANTEUS*, Gm.

S.W. coast of Madagascar.

23. *PLOTUS LEVAILLANTII*, Licht.

S.E. Madagascar.

### 3. Descriptions of new Species of Phytophagous Coleoptera.

By MARTIN JACOBY.

[Received November 24, 1879.]

#### Genus LEMA.

##### 1. *LEMA CHAMPIONI*, sp. nov.

Elongate, subparallel, fulvous. Head and breast black; antennæ piceous, their base and apex fulvous; elytra punctate-striate, dark violaceous blue, shining, a slightly curved median transverse band and the apex fulvous.

Length  $3\frac{2}{3}$  lines.

*Hab.* Zapote, Guatemala.

Head not constricted behind the eyes, impunctate; lateral grooves very deep; eyes deeply emarginate, large, the space surrounding them distinctly punctured; epistome impunctate, shining black; antennæ rather robust, of half the length of the body, the second joint very short, third joint double the length, the basal as well as the fourth to the seventh joints piceous, or black, the rest light fulvous; thorax slightly longer than broad, moderately constricted in the middle at each side, base scarcely perceptibly impressed, surface impunctate, fulvous. Scutellum black. Elytra much broader than the thorax, rather convex and parallel, narrowly transversely depressed below the base, deeply punctate-striate at their anterior half, the punctuation gradually diminishing, and almost obsolete towards the apex, where the interstices are slightly convex, the latter also minutely punctate, of a dark violaceous blue, the middle is occupied by a slightly convex fulvous band extending to the lateral margins, while the entire apex is of the same colour. Abdomen and legs also fulvous.

Collected by Mr. Champion.

This species may be distinguished from *L. bicincta*, Lac., and others similarly marked, by the colour of the antennæ and the distinct basal depression of the elytra.

2. *LEMA NICARAGUENSIS*, sp. nov.

Elongate, parallel. Head and thorax ferruginous; antennæ (base excepted), breast, tibiæ, and tarsi black; elytra bluish black, the lateral margins, a transverse median band, and the apex flavous; femora and abdomen testaceous.

Length 3 lines.

*Hab.* Chontales, Nicaragua.

Head not constricted behind the eyes, with a transverse and a median groove at the vertex, entirely impunctate, shining ferruginous, epistome black; palpi and the two basal joints of the antennæ ferruginous, the other joints piceous, the apex of each joint fulvous. Thorax subquadrate, the sides moderately constricted behind the middle; surface distinctly transversely grooved near the base, with two rows of small punctures placed longitudinally on the disk, rest of the surface smooth, shining ferruginous. Elytra deeply punctate-striate anteriorly, the punctuation gradually diminishing, but remaining distinct to the apex, the interspaces near the latter slightly costate; a rather obsolete transverse depression is placed below the base; the colour is a dark bluish black, the lateral margins, a transverse median band not quite touching the suture, and the apex flavous. Abdomen and the femora testaceous; breast, tibiæ, and tarsi black.

This species bears a close resemblance to several others described by Lacordaire and Clark, from all of which, however, it differs in the coloration of one or other parts. It is most nearly allied to *L. placida*, Lac., and *L. violaceo-fasciata*, Clark. The colour of the femora and of the apex of the elytra distinguishes it from the first species, while it differs from the last by the red head and the colour of the antennæ; it may, however, turn out to be a variety of one or the other.

3. *LEMA ANTENNALIS*, sp. nov.

Elongate, parallel; chestnut-coloured, variegated with piceous. Antennæ short, the joints transverse, black; elytra piceous, margined with brown, punctate-striate, intervals finely rugose.

Length 3 lines.

*Hab.* Zapote, Guatemala.

Head impunctate, lower part of face sparingly fulvous-pubescent; eyes deeply emarginate: antennæ short and robust, only reaching to the base of the elytra; three basal joints brown, shining; the rest black, closely pubescent; first joint swollen, round; second of the same shape, shorter; third half as long again as the second; the following joints gradually widened, transverse, broader than long. Thorax without transverse basal depression, subquadrate, brown, shining, obsoletely streaked with piceous, surface minutely punctured. Elytra deeply punctate-striate anteriorly, the punctuation diminishing



in depth towards the apex, interspaces also minutely punctate, and from below the base to the apex closely and finely transversely wrinkled; there is also an indistinct transverse depression below the base; the ground-colour is a dark chestnut-brown; the disk, however, is almost entirely occupied by a broad piceous band, commencing below the base and extending to the apex, leaving only the sutural and lateral margins brown. Underside and legs of the same colour, abdominal segments margined with piceous, claws entirely of that colour. The hinder femora very short.

This interesting *Lema*, of which I have at present only one specimen before me, will be easily recognized by the curiously shaped antennæ and the sculpture of the elytra, although it is doubtless subject to variation in colouring.

#### Genus URODERA, Lac.

##### 4. URODERA GODMANI, sp. nov.

Oblong-ovate, black, shining, beneath closely pubescent. Head and thorax finely punctured. Elytra finely punctate-striate, black, a transverse band at the base, not touching the suture and the apex, rufous.

Length 3–4 lines.

*Hab.* Dueñas, Capetillo (Guatemala).

Head with an obsolete transverse semicrescent groove between the eyes, distinctly but finely punctured. Antennæ short, black, the second and third joints rufous, dentate from the commencement of the fourth joint. Thorax transversely convex, about twice as broad as long, its sides moderately rounded and greatly deflexed anteriorly, the lateral margins flattened and divided from the convex part by an oblique depression; the flattened portion distinctly punctured and subrugose, rest of the surface very finely punctate, posterior margin oblique at each side, its middle lobe straight. Scutellum with a few extremely minute punctures. Elytra not wider at the base than the thorax; each elytron with nine rows of punctures and a short double row near the suture black; a transverse band, sinuate below the humeral callus and interrupted at a little distance from the suture, and an oblong apical spot rufous; the latter spot does not quite touch the lateral margin or the suture. Underside closely covered with greyish pubescence; anterior legs longitudinally sulcate at their inside; prosternum very narrow.

The punctured head and thorax will distinguish this species from others similarly marked, while the design of the elytra separates it from *U. chevrolatii*, to which it bears some resemblance; the thorax is also much more transverse than in the latter species. None of the specimens before me differ except in size from each other.

#### Genus CHLAMYS, Knoch.

##### 5. CHLAMYS SEX-TUBERCULATA, sp. nov.

Quadrata-ovate. Head, body below, and legs fulvous, spotted with violaceous; above violaceous blue, clothed with white pubescence,

thorax finely. Elytra strongly punctured, each elytron with three small tubercles placed triangularly.

Length  $1\frac{3}{4}$  line.

*Hab.* Capetillo, Dueñas, Guatemala.

Head flat, distinctly punctured, fulvous, eyes deeply emarginate. Antennæ as long as the thorax; the joints from the fifth to the apex transverse, broader than long; the four basal joints fulvous, the rest black. Thorax regularly narrowed from base to apex, its sides straight, surface regularly convex, finely punctate and pubescent, violaceous blue. Scutellum large, darker blue, opaque. Elytra narrowed posteriorly, their apex broadly rounded, closely covered with deep oblong punctures, their sutural margins denticulate through their entire length, each elytron with a short transverse tubercle placed in the middle near the sutural margin, while another small round tubercle is situated above and one below it, the three forming together a triangle. Pygidium fulvous, with a central blue patch. Underside violaceous blue, broadly bordered with fulvous. Legs fulvous, the middle and posterior tibiæ, as well as the posterior femora, with a blue spot.

This species ought to follow *C. cinerea*, Lac., to which it bears a close resemblance; it may, however, be distinguished by the coarser punctuation of the elytra and the three tubercles on the latter.

#### Genus LAMPROSOMA, Kirby.

##### 6. LAMPROSOMA NICARAGUENSE, sp. nov.

Broadly ovate, very convex. Above dark violaceous; body beneath, the head, sides of the thorax, and a short lateral stripe near the apex of the elytra cupreo-aureous.

Length  $3\frac{1}{4}$  lines.

*Hab.* Chontales, Nicaragua.

Head finely granulose, distinctly but not closely punctured; middle impressed with a small round fovea; anterior margin of clypeus concave; labrum and apex of mandibulæ black; first joint of the antennæ cupreous, second joint fulvous, the rest more or less metallic greenish black. Thorax twice as broad as long, sides rounded, moderately converging from base to apex; posterior margin rather deeply sinuate on either side, and obsoletely depressed on each side of the middle lobe; surface transversely convex, impunctate at the sides, distinctly but not closely punctured on the disk, more deeply towards the base, violaceous blue with a distinct tint of greenish olive, and a broad band of bright reddish copper-colour parallel with the lateral margins. Elytra very convex at the base, thence to the apex greatly deflexed, slightly longer than broad, each elytron covered with ten rows of very deep punctures, the interstices smooth and impunctate, of the same colour as the thorax, with a short lateral band of bright aureous near the apex. Entire underside and legs metallic aureous.

From *L. pretiosum*, Lac., distinguished by the punctures of the thorax and the colour of the antennæ and the elytra. From *L. dives*,

Lac., equally different by its coloration and the deep punctures of the elytra; while *L. hypochryseum*, Baly, is devoid of the metallic elytral band.

Genus *CHALCOPLACIS*, Chev.

7. *CHALCOPLACIS INSTABILIS*, sp. nov.

Subrotundate-ovate. Above cupreous or dark blue, shining, head cupreous or violaceous blue; antennæ black, their six basal joints fulvous; thorax finely, elytra more deeply punctate; below and the legs black.

Length 2 lines.

*Hab.* Zapote, Guatemala.

Head rather deeply punctured, lower part of face more closely punctate than the vertex, clypeus not separated; jaws very prominent; antennæ subfiliform, third and fourth joints of equal length, seventh and the following joints thickened, black, six basal joints fulvous, the first stained with piceous above. Thorax transversely convex, narrowed from base to apex, anterior angles acute; surface minutely punctured. Scutellum broad, impunctate. Elytra slightly wider at the base than the thorax, convex, the extreme apex rather acutely produced, surface much more strongly punctured than the thorax, the puncturing arranged in irregular rows, the sutural margin accompanied at its posterior third by an impressed line. The colour varying from purplish cupreous to dark greenish blue. All the latter-coloured specimens have the head igneous or cupreous, while the reverse is the case with the cupreous ones, whose head is violaceous. Underside black, legs with a coppery hue.

Genus *NODA*, Chapuis.

8. *NODA TASMANICA*, sp. nov.

Oblong-ovate. Æneous; antennæ piceous, their base and the legs entirely fulvous; head and thorax coarsely punctate, elytra each with four smooth longitudinal costæ, their interstices deeply punctate.

Length 2 lines.

*Hab.* Tasmania.

Head with a deep longitudinal groove in middle, deeply and closely punctured; labrum fulvous, its base piceous; palpi testaceous, their apex as well as the mandibles piceous; antennæ about half the length of the body, second and third joints short, of nearly equal length, the seventh to the eleventh joint thickened and cylindrical, piceous or black, five or six basal joints fulvous. Thorax transversely convex, its sides rounded and widened in the middle, posterior margin broadly produced in middle, surface deeply and closely punctured, interrupted here and there by some smooth semielevated spaces, brownish or greenish æneous. Scutellum as broad as long, in one specimen broader than long, impunctate. Elytra scarcely wider at the base than the thorax, about three times as long, punctured like the thorax, the punctures sometimes confluent and interrupted by four

longitudinal smooth costæ which unite near the apex, the outer one being placed close to a longitudinal sulcation which runs parallel with the lateral margin; the interstices are more or less distinctly transversely rugose. Underside closely silvery pubescent, legs fulvous, last joint of tarsi piccous.

Genus PRIONODERA, Chapuis.

9. PRIONODERA GODMANI, sp. nov.

Elongate. Testaceous; antennæ with joints 5-7 and 10-12 black; elytra coarsely punctate and subrugulose, each elytron with a spot at the base and one near the apex metallic green.

Length  $4\frac{1}{2}$  lines.

*Hab.* Zapote, Guatemala.

Head deeply but not closely punctured, with a shallow fovea between the eyes; antennæ two thirds the length of the body, testaceous, from the fifth to the seventh and the three apical joints black. Thorax nearly twice as broad as long, its sides tridentate, the posterior tooth obsolete and more rounded, the anterior ones acute and distinct; surface rather convex, closely but not more deeply punctured than the head. Scutellum smooth. Elytra wider at the base than the thorax, deeply and coarsely but irregularly punctured, the puncturing near the suture, however, more regularly striate; the interstices coarsely rugose and transversely wrinkled at the base and near the apex, the latter also distinctly costate, each elytron with two large metallic green patches, one of which, situated at the base, is of a semitriangular shape with its inner margin obliquely cut; the other patch is placed below the middle, of a more rounded shape; neither of them extends to either the lateral or sutural margin. The entire underside and the legs testaceous.

Several similarly coloured species have been described, from all of which the present one is distinguished by the colour of the antennæ, which is constant in all the specimens before me, as well as by the shape and margination of the thorax and the colour of the elytral spots.

Collected by Mr. G. Champion.

Genus FIDIA, Baly.

10. FIDIA GUATEMALENSIS, sp. nov.

Subcylindric, elongate. Bronze-coloured, closely covered with white pubescence; thorax deeply punctate; elytra coarsely punctate-striate, the interstices costate.

Length 2-3 lines.

*Hab.* Dueñas, Capetillo (Guatemala).

Head strongly punctate, with a short longitudinal groove in the middle; eyes entire, convex; antennæ longer than half the body, black, with a greenish hue on the surface of the basal joints, the latter fulvous below; the first six joints (with the exception of the short second joint) slender, filiform, and of nearly equal length, the rest much thicker. Thorax cylindric, slightly contracted at the

base and apex; surface rather more deeply punctured than the head. Scutellum elongate, pubescent. Elytra much wider than the thorax, parallel, convex, the space below the base very slightly transversely depressed; humeral callus prominent, smooth; surface very deeply punctate-striate, the interstices costate and partly, especially towards the sides, transversely wrinkled, here and there covered with more minute punctures, and covered with long whitish stiff hairs. Base of the femora and tibiae fulvous, apex of latter and the tarsi piceous.

This species, which was sent over by Mr. Champion in numerous specimens, may be readily known from others by its metallic bronze colour and the deep punctured striae on the elytra.

### Genus COLASPOIDES, Castlenau.

#### 11. COLASPOIDES BATESI, sp. nov.

Broadly ovate, convex; shining metallic green, base of antennae and palpi fulvous; head and thorax obsoletely punctured, elytra distinctly punctate-striate.

Length  $2\frac{1}{2}$ –3 lines.

*Hab.* Costa Rica.

Head impunctate on the vertex, with a distinct fovea in the middle, clypeus bounded on either side by a deep depression, punctured and obsoletely transversely wrinkled; labrum æneous; antennae longer than half the length of the body, the four basal joints fulvous, the rest black; apical joint of palpi piceous. Thorax transverse, nearly three times as broad as long, narrowly margined, surface convex, obsoletely punctured. Scutellum large, oblong, impunctate. Elytra slightly wider at the base than the thorax, convex, and obsoletely obliquely depressed below the humeral callus; surface covered with numerous irregular rows of distinct but not deep punctures; interspaces smooth, impunctate. Underside, legs, and tarsi metallic green, the latter rather darker.

To be distinguished from *C. smaragdula*, Lefev., and other allied species by its uniform coloration of the legs and tarsi and the obsolete punctuation of the thorax, as well as by the colour of the labrum.

#### 12. COLASPOIDES PERUANA, sp. nov.

Oblong, convex. Dark violaceous blue, shining; palpi, base of antennae, and the legs fulvous; thorax distantly, elytra closely punctate-striate.

Length 4 lines.

*Hab.* Chanchomayo, Peru.

Head deeply but distantly punctate, front impressed in the middle with a longitudinal groove; labrum fulvous; mandibulae black; antennae rather more than half the length of the body, filiform; the third and fifth joints of equal length; second joint small, ovate; the four basal joints fulvous, the rest black. Thorax more than three times as broad as long, very convex, the sides and the posterior mar-

gin much rounded, the latter broadly produced in the middle, all the angles acute, the anterior ones slightly produced; surface remotely but distinctly punctured. Elytra broadly oblong, rather convex posteriorly, rather closely and regularly punctate-striate, more distinctly near the base than towards the apex, where the punctures diminish greatly in size. Entirely dark violaceous blue; underside of the same colour, the legs and tarsi fulvous. Thighs unarmed.

Distinguished from *C. alcyonea*, Erichs., by its greater size, the colour of the antennæ and the underside; from *C. tibialis*, Lefev., by the uniform coloration of its legs.

### 13. COLASPOIDES AUSTRALIS, sp. nov.

Oblong-ovate, broad. Bluish æneous beneath, cupreous or violaceous above; base of antennæ, labrum, and legs fulvous; thorax coarsely, elytra substriate-punctate.

Length 3 lines.

*Hab.* Australia, Queensland.

Upper portion of the head finely, lower portion coarsely punctate; the apex of the clypeus, labrum, and palpi fulvo-testaceous; antennæ filiform, the first six or seven joints fulvous, the rest black. Thorax twice as broad as long, sides nearly straight at the base, rounded and narrowed towards the apex, the posterior margin being in consequence double as wide as the anterior one; surface convex, not very closely impressed with deep oblong punctures, which are more crowded at the sides than on the disk. Scutellum very broad, smooth, metallic green or cupreous. Elytra slightly depressed below the basilar space, the depression not quite extending to the suture, rather deeply and regularly punctate-striate, the interspaces smooth, but transversely wrinkled below the base near the lateral margins; the latter are also impressed through their entire length with deep punctures; the first two rows of punctures unite before the middle and form one row of closely approached punctures which runs parallel with the suture to the apex, the latter obsoletely costate. Underside piceous with a metallic bluish gloss, legs piceous or dark fulvous, thighs not armed with a tooth.

### 14. COLASPOIDES UNICOLOR, sp. nov.

Ovate, very convex. Dark violaceous, base of antennæ and palpi testaceous; head and thorax distantly, elytra closely punctured.

Length 3 lines.

*Hab.* Chontales, Nicaragua.

Head deeply but not closely punctured, with a longitudinal groove in the middle of the vertex; clypeus more closely punctured, labrum metallic green; basal joints of palpi fulvous, the apical joint piceous; antennæ filiform, the third joint very slender and the longest, the fourth half the length, the three or four basal joints testaceous, the rest black with a greenish gloss. Thorax very narrow, at least three times as wide as long, sides evenly rounded, posterior margin much produced towards the middle, anterior one much deflected towards the sides, surface very distinctly punctured on the disk, more closely

towards the sides. Scutellum broad, oblong, impunctate. Elytra convex, the humeral callus but slightly produced, surface very distinctly punctate, the puncturing arranged in irregular rows, dark violaceous blue, shining; innerside of the same colour but with a metallic green tint, particularly visible on the tibiae and tarsi.

I add here the diagnosis of two well-marked species contained in my collection, but whose habitat is not known to me at present:—

15. *COLASPOIDES DECEMMACULATA*, sp. nov.

Oblong-ovate. Ferruginous; head closely punctate, substrigose at the vertex; thorax less closely, moderately strongly punctate, with four transversely placed small black spots; elytra wider than the thorax at the base, minutely granulate, closely and irregularly punctured, each elytron with five large yellow spots margined with piceous, of which two are placed transversely at the base, two at the middle, and one near the apex.

Length 4 lines.

16. *COLASPOIDES VARIABILIS*, sp. nov.

Ovate, convex. Fulvous; lower part of head sparingly punctate, the anterior margin with two or three piceous spots; thorax obsoletely punctured, four transversely placed patches and the margins piceous; elytra closely and distinctly semipunctate-striate, each elytron with two longitudinal spots at the base, two other larger ones at the middle, transversely placed, and a large transverse patch near the apex, as well as the suture, ferruginous.

Var. *a.* Thorax and underside black.

Var. *b.* Thorax unspotted, elytra with *black* spots, the basal ones united or normal.

Var. *c.* The patches on the elytra reduced to five or six small black spots, underside piceous, base of thighs and the tibiae fulvous.

Genus *ZYGOGRAMMA*, Chev.

17. *ZYGOGRAMMA CHAMPIONI*.

Oblong-ovate. Dark æneous, shining, antennæ and tarsi fulvous; elytra irregularly punctured, their lateral margins light flavous.

Length 3 lines.

*Hab.* Capetillo, Guatemala.

Head deeply but not closely punctured; labrum, palpi, and antennæ fulvous, the latter with their joints gradually thickened and reaching to the base of the thorax, the third joint about double as long as the second. Thorax narrowly transverse, the anterior margins but little concave behind the eyes and almost straight, sides widened and rounded before the middle, parallel thence to the base; surface rather deeply punctured on the disk, intermixed with smaller punctures, very strongly and deeply punctate at the sides; there is also a deep irregular-shaped fovea at each side near the anterior margin. Scutellum large, impunctate. Elytra narrowed towards the apex, deeply and irregularly punctured, with the exception of a regu-

lar row accompanying the sutural margin; dark æneous, their lateral margins broadly flavous; this band is slightly narrowed and sinuate below the shoulders. There is also in one specimen before me a short stripe of flavous between the margin and the scutellum at the base of each elytron. Underside and legs greenish æneous, extreme apex of tibiæ and the tarsi fulvous.

Collected by Mr. G. Champion.

### Genus *STILODES*, Chev.

#### 18. *STILODES BELTI*, sp. nov.

Ovate-rotundate. Obscure brownish æneous, submetallic; elytra geminate-punctate-striate, flavous, the suture (widened before and behind the middle) and three longitudinal rows of elongate spots dark brown.

Length  $4\frac{1}{2}$ -5 lines.

*Hab.* Chontales, Nicaragua.

Head distinctly and moderately closely punctured, labrum brown, apex of mandibles and the antennæ obscure piceous; the latter gradually thickened, with their apical joints longer than broad. Thorax transverse, anterior margin straight in middle, posterior one produced, sides rounded, the anterior angles slightly produced; surface coarsely punctured near the sides, more finely on the disk, with a small but deep round fovea at each side, of the same brownish æneous colour, as the head. Scutellum smooth. Elytra convex, geminate-punctate-striate on the disk, more irregularly punctured near the sides, the first sutural stria very short, flavous, with three parallel rows of irregular-shaped dark brown spots placed as follows—the first row on the disk (consisting of four spots of increasing size), the second and third row (of three spots each) placed towards the lateral margin without, however, touching the latter, their two anterior spots joined at the shoulder into an elongate  $\Delta$ -shaped mark: two other short stripes are connected with the suture anteriorly and posteriorly. Outer limb, underside, and legs brownish æneous.

#### 19. *STILODES FLAVO-MARGINATA*, sp. nov.

Ovate, convex. Dark violaceous blue; elytra punctate-striate, each elytron margined with a broad crescent-shaped yellow band from the base towards the apex.

Length 4 lines.

*Hab.* Brazil.

Vertex rather convex, with an indistinct middle line; head rather sparingly but distinctly punctured; three lower joints of the antennæ light brown, the rest piceous and gradually increasing in width. Thorax transverse, its sides parallel at the base, rounded towards the apex and finely margined; surface sparingly impressed with punctures like those of the head, almost impunctate towards the sides. Scutellum smooth, trigonate. Elytra slightly wider at the base than the thorax, narrowed and rounded towards the apex; surface of each elytron impressed with ten rows of rather deep punctures, the first



of which is very short, their interstices also extremely minutely punctate, dark violaceous blue, with a bright yellow band of crescent-shape, which, commencing at the base and running parallel with the lateral margin (without, however, quite touching it), turns inwards at a little distance from the apex, towards the suture, which, in the one specimen before me, it does not quite reach. Underside and legs rather darker blue than the upperside.

### HALTICINÆ.

#### 20. *CRIMISSA NIGRO-ORNATA*, sp. nov.

Broadly oblong-ovate. Black, base of antennæ and the femora fulvous; above testaceous. Thorax with three transversely placed black spots. Elytra irregularly punctured, each elytron with a black longitudinal spot on the shoulder.

Length  $5\frac{1}{2}$ –6 lines.

*Hab.* Columbia.

Head swollen, impunctate, with an elongate triangular black spot at the vertex; the space immediately above the insertion of the antennæ but slightly raised and divided by a broad triangular groove, black; apex of jaws and palpi black; antennæ shorter than half the length of the body, with the basal joint slender, curved, and the longest, the fifth joint slightly longer than the rest, first joint entirely testaceous, the second to the fifth spotted with piceous on each side, the remaining joints black with only the extreme base testaceous. Thorax transverse, about three times as broad as long, the anterior and posterior margins produced in the middle, sides nearly straight and widened towards the base; all the angles acute, the anterior ones much produced and pointed; surface slightly convex, smooth, shining, and impunctate, with a round spot at each side and a short longitudinal streak in the middle near the base black. Scutellum pentagonal, obsoletely edged with piceous. Elytra convex, scarcely broader at the base than the thorax, distinctly and rather closely punctured, of the same colour as the thorax, or a little lighter testaceous, with a longitudinal black spot on the humeral callus. Underside black, the femora fulvous, the posterior ones with a black spot; the tibiæ and tarsi also more or less stained with black.

In one specimen, which may prove to be the female, of rather larger size, the black colour predominates beneath, the spots on the thorax are much enlarged, especially the middle one, and the elytral spots extend in the shape of longitudinal pointed vittæ from the shoulder to nearly the apex.

#### 21. *HOMAMMATUS CLARKI*, sp. nov.

Oval, convex, robust. Dark chestnut-coloured, subpubescent. Antennæ dilated towards the apex, fulvous, the sixth to the ninth joint black; elytra with a small black spot before the middle.

Length  $2\frac{3}{4}$  lines.

Head with the usual transverse depression, light brown, deeply punctate at the base, leaving, however, a space in the middle of the vertex smooth; anterior part testaceous; maxillary palpi filiform; antennæ reaching to about one third of the length of the elytra, the first joint much thickened, as long as the third, the second short, rounded, joints sixth to ninth thickened and widened, the rest a little more elongate, closely pubescent. Thorax about twice as broad as long; the anterior angles pointed and slightly produced outwards; sides sinuate near the base, but not angulate; surface with a shallow depression on each side, and a short, raised, longitudinal, smooth space in the middle, not touching either the anterior or posterior margin; the disk covered with punctures as deep as those of the head, more curved near the base and sides than at the anterior portion, and covered sparingly with golden-yellow hair; an obscure spot of fuscous is visible at each side and on the disk. Elytra much wider than the thorax, convex and subcylindrical, finely punctate striate, more obsolete near the apex, covered also sparingly with silky yellow pubescence; they are slightly depressed before the middle, of a dark chestnut colour, rather shining, and have each an obscure, round black spot placed in the hollow of the depression. Underside and legs lighter-coloured, the posterior thigh with a rather large black patch on the outside; posterior tibiæ near the apex with comb-like teeth and one spur; claws appendiculate.

*Hab.* Amazons.

The dilated antennæ, antemedian depression of the elytra, together with the spur at the posterior tibiæ, show this species to belong to Clark's genus *Homammatus*, although it might perhaps have been placed, with equal right, amongst the genus *Homotyphus* or allied genera. Von Harold, in the 'Coleopt. Hefte,' has already pointed out the artificial construction of many of Clark's genera, founded very often on doubtful and variable structures of different organs; and it is very possible that the student may often be puzzled as to the genus to which an insect of this family belongs.

## 22. ALLOCHROMA BIMACULATA, sp. nov.

Oblong, ovate, robust. Light fulvous, glabrous; antennæ, the four anterior legs, and a spot on each elytron before the middle black.

Length 3 lines.

Head with a few fine punctures, a round fovea in the middle of the vertex, and a transverse groove between the eyes; another deep longitudinal fovea is situated between the antennæ; the latter are short and robust, entirely black, the first joint is claviform, the second short and rounded, the third nearly as long as the first, the fourth and fifth joints shorter and of equal length, the sixth joint dilated and much more robust than the others, the rest rather short and slightly widened; maxillary palpi robust, the penultimate joint transverse, the last joint conical and pointed. Thorax transverse, all the angles acute and rather produced, the sides distinctly angulated before the middle, thence to the base concave, not straight; surface rather convex, with two shallow foveæ at each side near

the base, the space between them also obsoletely depressed; the entire disk very distinctly but widely punctured, uniformly fulvous. Scutellum impunctate. Elytra wider than the thorax at the base, gradually narrowed posteriorly, with a distinct transverse depression below the base; each elytron with ten rows of deep punctures, which diminish in depth towards the apex; they are of the same colour as the other parts, and have a black round spot exactly at the end of the basilar depression, between the margin and the suture. Underside of a little deeper tint than the upper one. The four anterior legs black; the claws, however, and the posterior ones fulvous. Posterior thighs reaching beyond the apex of the elytra; claws appendiculate; posterior tibiæ with two distinct spurs.

One specimen in my collection from Nicaragua.

The glabrous elytra, shape of the palpi, as well as the organization of the hinder tibiæ, which are armed with two spurs, place this insect in the genus *Allochroma* as defined by Clark, while the coloration will distinguish it from the other species of this genus.

#### GALERUCINÆ.

##### Genus CÆLOMERA.

#### 23. CÆLOMERA NIGRICOLLIS, sp. nov.

Elongate, subparallel. Flavous; head and thorax piceous or black, finely pubescent; elytra dark purplish-red, finely punctate and pubescent.

Length 6 lines.

*Hab.* Mountain of Irazu, Costa Rica.

Head deeply foveolate in the middle, obsoletely punctured, black; clypeus flavous; antennæ black, covered with yellowish hairs. Thorax deeply transversely depressed in the middle, with a few other smaller depressions near the sides and base; surface covered with minute punctures and thin yellowish hairs, piceous or black, the margins narrowly fulvous. Scutellum piceous. Elytra convex, widened from the middle to the apex, very closely and minutely punctured, covered thinly with yellowish pubescence of a reddish-purple colour. Underside flavous; tibiæ and tarsi black.

Nearly allied to *C. submetallica*, Clark, but separated from that species by the black thorax and the fine punctuation of the elytra, as well as by the almost entirely black head. I have more than half a dozen specimens before me, all of which agree exactly with each other.

Collected by Mr. Rogers.

#### 24. CÆLOMERA GODMANI, sp. nov.

Elongate, parallel. Flavous; head and thorax with two large spots; elytra finely punctate and pubescent, fuscous; tibiæ, tarsi, and antennæ black.

Length 6 lines.

*Hab.* Chontales, Nicaragua.

Head very minutely punctured, with an indistinct median and a

more distinct transverse groove between the eyes; apex of the mandibulæ piceous; base of the head occupied at each side by a large elongate black spot; antennæ short, black, pubescent. Thorax nearly three times as broad as long, transversely impressed across the entire disk, minutely punctured, flavous or rufous, with a large round black patch at each side near the posterior margin, where the puncturing is a little more distinct. Scutellum flavous, pubescent. Elytra a little wider than the thorax, parallel or very little widened posteriorly, exceedingly close and minutely punctured, of a dark fuscous colour, and covered with thin whitish pubescence. Underside and the femora flavous; knees, tibiæ, and tarsi black.

To be distinguished from *C. maculicollis*, Clark, by the larger size, the two-spotted thorax, and by the minute punctuation of the latter and of the elytra, while it differs from *C. binotata*, Dej., in the coloration as well as the sculpture of the elytra.

### Genus CETHONEIS, Baly.

#### 25. CETHONEIS JANSONI, sp. nov.

Elongate, parallel. Black; head and thorax flavous; four apical joints of the antennæ testaceous; elytra violaceous, closely punctured, and transversely rugose.

Length 3 lines.

*Hab.* Chontales, Nicaragua.

Head impunctate, deeply transversely grooved between the eyes; labrum and palpi piceous; antennæ as long as the body, closely pubescent, with the exception of the first joint, second and third joints short, black, the last four joints testaceous or flavous. Thorax transverse, about twice as broad as long, anterior margin slightly concave in the middle, sides narrowed at the base; surface moderately convex, impunctate, shining flavous. Scutellum black. Elytra wider at the base than the thorax, closely and distinctly punctured; the interstices transversely wrinkled or semireticulate; entirely dark violaceous, semiopaque. Underside and legs black, covered with whitish pubescence.

The colour of the head and thorax principally distinguishes this species from *C. apicicornis*, Baly.

Collected by Mr. Janson.

#### 26. CETHONEIS SMARAGDIPENNIS, sp. nov.

Elongate, parallel. Flavous; antennæ, tibiæ, and tarsi black; thorax transversely foveolate; elytra bright metallic green, closely rugose punctate.

Length 3-3½ lines.

*Hab.* Capetillo, Guatemala.

Head not longer than broad, vertex with a few minute punctures, carina and encarpæ ill-defined; antennæ as long as the body in the male, shorter in the female, second and third joint very small, moniliform, fourth joint longer than the first three joints together. Thorax subquadrate, its sides widened in the middle and contracted

near the base; surface impunctate, very shining, flavous, the disk near the base deeply but irregularly transversely foveolate. Scutellum flavous. Elytra wider than the thorax, very bright metallic green, closely and rather coarsely rugose-punctate; tibiæ and tarsi black, first joint of latter longer than the following joints together. Claws appendiculate.

This species seems to form a connecting link between the genus *Scelida* of Chapuis and the present one; it may with equal right be classed amongst the first on account of the unarmed tibiæ and other characters; but as in *Scelida* the third joint of the antennæ is much longer than the second, while here it is as short, I have included it in the present genus, although it differs from the typical species in not having the joints of the antennæ dilated.

### Genus SCELIDA, Chapuis.

#### 27. SCELIDA VIRIDIS, sp. nov.

Elongate, parallel. Metallic green, pubescent below; head, thorax, antennæ, and legs flavous; elytra closely rugose-punctate, metallic green.

Length 6 lines.

*Hab.* Mexico.

Head elongate, vertex swollen, with a deep fovea in the middle, apex of jaws piceous; antennæ half the length of the body, the second joint short, the fourth slightly longer than the third. Thorax nearly square, its sides, from the middle to the base, nearly parallel; surface impunctate, with a deep oblique fovea at either side. Scutellum flavous. Elytra much wider than the thorax, parallel, closely rugose-punctate. Underside metallic green, the sides of the breast and the posterior margins of the abdominal segments closely covered with long white hairs. Legs entirely flavous.

Of the two other described species, *S. elegans*, Chapuis, and *S. balyi*, Jacoby, the present one will be easily recognized by its green underside and the entirely flavous antennæ and legs.

### Genus MONOTIA, Le Conte.

#### 28. MONOTIA VIRIDIS, sp. nov.

Oblong-ovate, convex. Obscure flavous beneath; above dark olive-green, opaque, finely punctate and pubescent.

Length 4 lines.

*Hab.* Zapote, Guatemala.

Head with a longitudinal middle groove, rather deeply and closely punctured, clypeus narrow, transverse; labrum obscure piceous; antennæ about half the length of the body, the basal joint olive-green, the following joints testaceous, the last three piceous or black; the first and fourth joints are of equal length, the second half the size of the third. Thorax transverse, sides slightly angulate before the middle; surface obsoletely impressed near the anterior and lateral margins, finely and not distinctly punctured.

Scutellum large, its apex rounded, flavous, impunctate. Elytra slightly widened posteriorly, convex, minutely punctured, and covered with yellowish pubescence, which, however, is only visible in a certain light; the dark green colour is like that of the thorax, here and there stained with purplish patches, but without possessing any gloss. Underside, as well as the inside of the posterior femora, flavous; legs olive-green, shining; tibiæ simple, unarmed, claws bifid.

Collected by Mr. Champion.

### Genus *OIDES*, Weber.

#### 29. *OIDES ALBERTISI*.

Oblong-ovate, convex. Testaceous; elytra closely punctate, fulvous, a large square patch at the base and another semitriangular one near the apex black.

Length 5 lines.

*Hab.* Somerset, Australia.

Vertex convex, smooth, with a fine longitudinal groove, and a deep transverse depression in front of the antennæ; the latter entirely testaceous, the second joint half the size of the first, third and fifth of equal length, fourth longer than either. Thorax nearly three times as broad as long, surface obsoletely punctured, with two or three obscure shallow depressions, testaceous, shining. Scutellum testaceous. Elytra slightly widened behind the middle, closely and distinctly punctured, fulvous, shining; each elytron with a large square patch at the base, neither reaching the sutural nor lateral margin, and another equally broad but more triangularly-shaped patch near the apex, black; the latter spot is also interrupted narrowly by the suture, and more broadly by the lateral margin. Entire underside and the legs testaceous.

This species is closely allied to *O. rubrum* and *O. ornatum*, Baly, but differs from the first in the colour of the antennæ and the basal markings of the elytra (which in the present insect do not reach to the lateral margin), and from the second by the pale coloration of the underside and also of the antennæ.

Collected by M. D'Albertis.

### Genus *AGETOCERA*, Hope.

#### 30. *AGETOCERA FLAVIVENTRIS*, sp. nov.

Elongate, robust, convex. Black, shining; antennæ flavous, their apex piceous; elytra violaceous, abdomen flavous.

Length 5 lines.

*Hab.* India.

Head elongate, with a deep groove between the eyes; base and apex of labrum fulvous; antennæ (♀) filiform, basal joint thickened, second short, third to the seventh joints equal, the eighth and following the longest, the joints increasing in thickness from the fourth to the ninth. Thorax transversely subquadrate, sides narrowly margined, dilated anteriorly; surface smooth, impunctate, deeply impressed behind the middle with a transverse short groove,

black, shining. Scutellum black, trigonate. Elytra dilated posteriorly, with a shallow depression below the basilar space, and several others near the lateral margins; another longitudinal sulcation runs parallel with the latter, but finishes at some distance before the apex; surface minutely and closely punctate, dark violaceous blue. Underside and legs black; abdomen flavous.

I unfortunately possess only one specimen, and that a female, of this distinctly-coloured species; the antennæ in the male will probably show the same dilatation as in the other species belonging to this genus.

#### Genus *NESTINUS*, Clark.

##### 31. *NESTINUS FLAVO-MARGINATUS*, sp. nov.

Elongate, parallel, rugose-punctate; finely pubescent. Flavous; base of the head, three transversely-placed spots on the thorax, antennæ, tibiæ, and tarsi black; elytra metallic cupreous, the margin flavous.

Length 5-5½ lines.

*Hab.* Mexico.

Head rugose-punctate, with a fine longitudinal median groove at the vertex extending to the clypeus, flavous, with an elongate black spot from the middle of the base to almost the anterior margin of the eyes; apex of labrum and the palpi black; antennæ about half the length of the body, black, basal joint thickened, robust, second short, third of double the length, fourth joint longer than the third and the longest. Thorax transverse, sides nearly parallel, all the angles slightly thickened, the posterior ones oblique; surface obliquely depressed at each side, longitudinally grooved in the middle, irregularly rugose-punctate, flavous, a spot at each side near the lateral margin, and another in the middle, a little distance from the base, black. Scutellum black, finely punctate and pubescent. Elytra closely rugose-punctate, finely flavous-pubescent near the margin, metallic cupreous, the lateral margins and apex flavous. Tibiæ and tarsi black. Claws bifid.

The flavous margination of the elytra will distinguish this species from those described by Clark.

#### Genus *DIABROTICA*.

##### 32. *DIABROTICA MARGINELLA*, sp. nov.

Subelongate, widened behind. Flavous; antennæ (joints seventh and eighth excepted), base of head, and two spots on the thorax greenish black. Elytra strongly punctate, broadly margined, metallic green, lateral and sutural margins, as well as the apex, flavous. Upper surface of femora and the tibiæ and tarsi black.

Length 3-4½ lines.

*Hab.* Costa Rica.

Head longer than broad, swollen, impunctate, front impressed with a small fovea; encarpæ obsolete; carina not visible; lower part of face flavous, labrum and vertex blackish green; antennæ two thirds the length of the body, filiform, the second joint short, the rest of

nearly equal length, black, the seventh and eighth joints light flavous. Thorax transverse, sinuate behind the middle, anterior angles slightly prominent; surface impunctate, flavous, with a large black spot at either side. Scutellum black. Elytra dilated posteriorly, broadly margined at the middle; surface strongly and closely punctured, metallic green, the margins and suture narrowly, the apex broadly flavous.

33. *DIABROTICA FOVEIPENNIS*, sp. nov.

Oblong. Flavous; thorax bifoveolate, minutely punctate; elytra finely but distinctly punctured, flavous, the suture (narrowly) and four very obsolete spots on the disk ferruginous, lateral margins interrupted in the middle by a deep fovea.

Length  $3\frac{1}{2}$  lines.

*Hab.* Dueñas, Guatemala.

Head very finely punctured, as long as broad; front with a small fovea; encarpæ and carina distinct; antennæ filiform, longer than half the body, second joint short, third of double the length, entirely flavous. Thorax transverse, subquadrate, sides finely margined, strongly contracted behind the middle, anterior angles not pointed, posterior ones slightly thickened, surface minutely punctured, bifoveolate on the disk, the foveæ closely approached. Scutellum smooth. Elytra slightly widened at the middle, closely and more deeply punctured than the thorax, each elytron with a deep fovea, situated immediately before the middle of the lateral margin, the latter itself being produced at that place into a triangular tooth, while the interior of the fovea contains another still more pointed triangular elevation; two indistinct spots, one before the other behind the middle, on the disk of each elytron, as well as the suture narrowly, ferruginous. Underside and legs entirely flavous. Claws appendiculate.

Collected by Mr. Champion.

This and the following species I rather reluctantly describe under the generic name of *Diabrotica*, on account of their appendiculated claws and the curious elytral foveæ. The latter character, I think, is peculiar to the male insect; but as in all other particulars the species agree with *Diabrotica*, I have placed them there for the present.

34. *DIABROTICA TRIPUNCTATA*, sp. nov.

Elongate. Obscure fulvous, base of femora and the antennæ black; vertex ferruginous; above yellowish or light testaceous, opaque. Scutellum, three triangularly placed spots on each elytron, and the suture black.

♂ (?). Elytra with a deep fovea near the lateral margin, before the middle.

Length 4 lines.

*Hab.* Capetillo, Dueñas (Guatemala).

Head not longer than broad, longitudinally and transversely grooved between the eyes; vertex ferruginous, lower part of face light testaceous; antennæ of the same shape and length as the pre-



ceding species, black. Thorax transverse, widened in the middle, the base contracted; surface minutely punctured, yellowish white, with an indistinct longitudinal fuscous line in the middle, sometimes entirely absent. Elytra rather convex, almost subcylindrical, scarcely more distinctly punctured than the thorax; two small spots, one of which is placed before, the other behind the middle, near the sutural, and a third spot between the two, near the lateral margin of each elytron, black. Underside fuscous or dark ferruginous, more or less stained with black. Legs flavous, base of the femora as well as the apex of the tibiae and tarsi more or less black. In the specimens which I take to be male, there is the same deep fovea near the lateral margin; but the latter itself is not interrupted as in the preceding species, and the internal tooth is not isolated, but connected with the sides of the fovea in the shape of a convex ridge. Claws appendiculate.

35. *DIABROTICA IMITANS*, sp. nov.

Oblong-ovate, dilated posteriorly. Black, base of head and the thorax fulvous; antennæ (their apex excepted), legs, and elytra bright flavous, the latter with four basal spots and two broad transverse bands black.

*Var.* The basal spots on the elytra united in the form of a third transverse band.

Length 3 lines.

*Hab.* Venezuela.

Lower part of face deeply excavated (♂), shining black, vertex and sides of face fulvous, the former with a few small punctures; basal joint of the antennæ very long and slender, as long as the fourth, second joint less than half the size of the third, first five or six joints flavous, the rest piceous. Thorax subquadrate, the hinder angles oblique, sides armed with a small tubercle at each side below the anterior angles; surface obsoletely transversely depressed, minutely punctured. Scutellum black. Elytra wider than the thorax, much dilated behind the middle, convex, deeply punctured, the interstices obsoletely rugose; flavous, two elongate spots at the base of each elytron (in the variety united into a band), a transverse regular band at the middle not touching the lateral margin, and another wider one near the apex black.

In the female the deep excavation of the head is wanting, and the fulvous colour extends much lower down. This species is at once distinguished from *D. ventricosa*, Jacoby (to which it is nearly allied in colouring), by the flavous margination of the elytra.

36. *DIABROTICA FENESTRALIS*, sp. nov.

Elongate, subparallel. Flavous; head, legs, and breast black; elytra flavous or testaceous, with the lateral and sutural margins and three transverse narrow bands, the first of which is connected with the second by a short lateral stripe, piceous.

Length 3 lines.

*Hab.* Chontales, Nicaragua, and Costa Rica.

Head impunctate, with a fovea between the eyes, black, the latter very convex and large; antennæ two thirds the length of the body, second and third joints very short, light piceous, two basal joints and the ninth and tenth light flavous. Thorax a little broader than long, the sides narrowly margined, the angles not produced, surface smooth, slightly convex, impunctate, light flavous, shining. Scutellum black. Elytra very closely and distinctly punctate, the margins and apex, as well as the base, a narrow transverse band immediately before and a second behind the middle, piceous; an oblique thin streak commencing at the humeral callus connects the basal with the first band; all these bands are sometimes more or less interrupted. Legs and breast black, abdomen flavous.

Genus CEROTOMA, Erichs.

37. CEROTOMA ATRO-FASCIATA, sp. nov.

Elongate. Black; thorax flavous, impunctate; elytra pale testaceous, a narrow transverse band at the base, dilated at the suture, and two small spots near the apex, black.

Length 2-2½ lines.

Hab. Guatemala.

Head black, shining, vertex distinctly but finely punctured, with a fovea in the middle; epistome coarsely punctured, its anterior margin concave; antennæ black or dark piceous, the base of the second and third joints paler, joints first and third long, of equal length, the rest short, pubescent. Thorax transversely quadrate, its sides narrowly margined; surface slightly convex, impunctate, flavous, this colour, however, often broken and obscure along the anterior and posterior margin. Scutellum black. Elytra gradually widened posteriorly, rather closely and distinctly punctate-striate, of a pale testaceous colour, with a more or less distinct longitudinal patch of fuscous on the disk below the middle; a narrow transverse black band, common to both elytra, is placed at the base, it commences at the shoulder, and is triangularly dilated below the scutellum at the sutural margin, where its point reaches to about one third of the length of the elytra; a small black spot is also placed near the apex of each elytron, at a little distance from the sutural angle. Underside black; femora and the anterior tibiæ flavous, each with a black dorsal streak; rest of the tibiæ and tarsi and the apex of the posterior femora black.

Collected by Mr. O. Salvin.

Genus ÆNIDEA, Baly.

38. ÆNIDEA BIPARTITA, sp. nov.

Elongate. Flavous; antennæ with the second to the fifth joint black, the third excavated near the apex; thorax transversely depressed. Elytra minutely punctured, the basal half black, the posterior one fulvous.

Length 4½ lines.

Hab. Sumatra.

Head very wide, vertex impunctate, encarpæ divided by a deep groove; face deeply excavated immediately below the antennæ, the anterior part of which is bounded at either side by a rounded lobe, while the latter are covered at their outer edge with long bristle-like hairs; penultimate joint of the maxillary palpi greatly swollen and dilated, the apical joint being almost buried in it; antennæ as long as the body, the first joint very slender and curved, the second very short, third joint as long as the first, dilated at the apex and deeply excavated, fourth and fifth joints nearly equal in length and as long as the first, covered, as well as the rest of the joints, with fringes of short hairs. Thorax transverse, sides greatly diverging from the base to the middle, from there to the apex produced and rounded; surface foveolate, either side near the base impunctate. Scutellum flavous, broad. Elytra convex, transversely depressed below the base, scarcely visibly punctured, from base to middle black, thence to the apex fulvous. Tibiæ and tarsi black.

Only a single specimen, a male, is known to me.

#### 4. Note on a Specimen of *Charybdea haplonema*.

By Prof. J. REAY GREENE, B.A., M.D., F.L.S., F.Z.S., &c.

[Received November 29, 1879.]

Dr. Pye-Smith, now Assistant Physician to Guy's Hospital, found, some years since, in the Museum of that institution, a nameless Medusa of strange appearance, from an unknown locality. Noting its exceptional form, he made a drawing of it, and at the same time observed such of its structural peculiarities as could be studied with due regard to the conservation of the single sample at his disposal. He also took the trouble of bringing the specimen to the meeting of the British Association at Belfast; but no one there could tell him to what group of jelly-fishes it should be referred. Hearing of this failure, I applied during the spring of the present year to Dr. Pye-Smith, who most kindly gave me every opportunity of examining this remarkable Medusa at my leisure.

I soon found that I had not to deal with an undiscovered species, but with none other than the *Tamoya haplonema* of Fritz Müller. It belongs to Gegenbaur's *Charybdeidae*, a group not represented among the Medusæ of the British coasts.

*Tamoya haplonema* was described and figured twenty years ago by its discoverer, who found it on the shores of Santa Catharina (Brazil) —“am Strande der Praia de fora bei Desterro.” It was not uncommon, more than a dozen specimens being sometimes procurable during one day. Occasionally it was accompanied by the much rarer *T. quadrumana*. No other naturalist appears to have met with these aculephs.

Our Medusa, however, is very closely allied to *Charybdea marsupialis*, the common marsupial Medusa of the Mediterranean. This species, the first discovered and best-known member of its group, is

the only charybdeid which has been reinvestigated by several observers. In particular Claus has just given us a monograph describing and illustrating, with great minuteness of detail, the form and structure of this common Mediterranean Medusa. His essay may justly rank as the most thorough analysis, hitherto published, of the anatomy of any Medusa whatsoever.

The affinity here noted was perceived by Fritz Müller, who at once referred his *Medusæ* to Gegenbaur's *Charybdeidæ*, in the definition of which family he proposed some modifications, to adapt it for the reception of the two species of the new genus *Tamoya*. The characters of the latter he contrasted with those of *Charybdea* (= *C. marsupialis* only) in parallel columns. But writing in 1859, at a distance from Europe, Fritz Müller needed the data we now possess for such a comparison. Claus, with his better knowledge of the Mediterranean species, has shown that the differences on which his predecessor relied do not in fact exist. We cannot estimate as of generic value the characters which separate *C. marsupialis* from *T. haplonema*. These *Medusæ* are therefore now placed in one genus (*Charybdea* of Claus, not Péron and Lesueur). They are very like one another, though both are obviously distinct from the rarer Brazilian species, *T. quadrumana*, for which the genus founded by Fritz Müller may still be retained.

The Brazilian is indeed much larger than the Mediterranean *Charybdea*, and in this respect resembles one of the unnamed *Charybdeidæ* (from the Philippine seas) provisionally described and figured in outline by Semper, who doubts the specific identity of any of his own forms with either of those discovered by Fritz Müller.

The *Charybdeidæ* are, unquestionably, of the greatest interest to any person wishing to understand the classification of the Hydrozoa. They occupy an intermediate position between the lower and the higher *Medusæ*, although, arbitrarily, they may be placed with the latter. Their (1) external morphology, (2) curiously modified cœlenteric system, (3) genitalia quite distinct from the central region of the bell, with its four accessory cavities for the gastric tentacles, (4) muscular apparatus, and (5), above all, their very distinct nervous ring and wonderfully complicated sensory organs display a number of characters, the study of which must amply reward every earnest student of the lower animals. The whole of this subject, to which, sixteen years ago, I endeavoured to direct attention, is now, at length, admirably presented in the work of Claus.

No English zoologist has written on the *Charybdeidæ*; nor, so far as I am aware, has any paper on the *Medusæ* been read before our Society since Edward Forbes, in 1851, made a communication on *Æquorea*. But the study of the *Charybdeidæ* is so important that I have thought it desirable to append to the present note a brief history of the literature of these animals.

Plancus (1739) was the first to describe and figure one of the *Charybdeidæ*. His "*urtica soluta marsupium referens*" is the

common Mediterranean species. The rude, scarcely recognizable, figure is spoken of as "a very miserable representation" by Edward Forbes<sup>1</sup>.

Risso<sup>2</sup>, in 1826, gave a very imperfect account of the species of *Planicus*, under the name proposed for it by Péron.

Milne-Edwards (1833) took the lead among modern naturalists in adequately redescribing this singular acaleph, whose marginal bodies were more fully analyzed by Gegenbaur in 1856. Gegenbaur again directed attention to *C. marsupialis* in his systematic essay on the Medusæ, based chiefly on Mediterranean studies. Gräffe (1858) also described it, noticing more especially its marginal bodies and bunches of gastric tentacles. Costa (1836) must be added to the list of original observers of the same species. Kölliker (1866), using the results of his own studies, briefly compared the minute structure of its gelatinous disk with that of other Medusæ. Finally (1878) appeared the crowning work of Claus.

Of the other *Charybdeidæ* much less is known. Each species named in the annexed list appears to have been seen by one observer only. None is described in a manner at all satisfactory, if we except the two species of Fritz Müller.

CHARYBDEA, Pér. & Le S.<sup>3</sup>

periphylla, Pér. & Le S.<sup>3</sup> ..... Equatorial Atlantic.

bicolor, Quoy & Gaim.<sup>4</sup> ..... Cape-Verd Islands.

bitentaculata, Quoy & Gaim.<sup>5</sup> ... Amboina.

campanella, Less.<sup>6</sup> ..... African Seas.

alata, Reynaud<sup>7</sup> ..... Atlantic Ocean.

TAMOYA, F. Müll.<sup>8</sup>

haplonema, F. Müll.<sup>8</sup> ..... Santa Catharina.

quadrumana, F. Müll.<sup>8</sup> ..... Santa Catharina.

MARSUPIALIS, Less.<sup>9</sup>

flagellata, Less.<sup>10</sup> ..... New Guinea.

BURSARIUS, Less.<sup>11</sup>

cythereæ, Less.<sup>12</sup> ..... New Guinea.

Thus *Charybdeidæ* have been found along the western shores of the equatorial Pacific and the adjacent parts of the Indian Ocean, in

<sup>1</sup> 'British Naked-eyed Medusæ,' p. 91. The supposed copy (*vide* Eschscholtz) of this figure by Bruguière represented, according to Forbes, another species of Medusa.

<sup>2</sup> *Op. cit.* (*infra*, p. 802). Little more than a record of the occurrence of this species near Nice.

<sup>3</sup> *Op. cit.* p. 332; Milne-Edwards (Cuvier), pl. 55. fig. 2.

<sup>4</sup> *Op. cit.* p. 293, and pl. 25. figs. 1-3.

<sup>5</sup> *Op. cit.* p. 295, and pl. 25. figs. 4, 5.

<sup>6</sup> Prodr. 23; Acalèphes, p. 267, and pl. 6. fig. 6.

<sup>7</sup> Lesson, Cent. zool. p. 95, and pl. 33; *Marsupialis alata*, Prodr. 26; Acalèphes, p. 278.

<sup>8</sup> *Op. cit.* (1859), p. 3, and Taf. i., ii.

<sup>9</sup> Prodr. 10; Acalèphes, p. 268.

<sup>10</sup> Prodr. 27; Acalèphes, p. 278. Not figured.

<sup>11</sup> Voy. de la Coquille, Zoophytes, p. 108; Prodr. 11; Acalèphes, 278.

<sup>12</sup> Coquille, Zoophytes, p. 108, and pl. 14. fig. 1; Acalèphes, p. 279. "*Beroë gargentua*, Less. Zool. Coq. pl. 15. fig. 1, seems to be only a large decayed specimen of the same species" (Agassiz, Contr. vol. iv. p. 174).

the tropical and subtropical regions of the Atlantic, and in the Mediterranean; while in latitude they extend from Nice and the Adriatic (*C. marsupialis*) to Santa Catharina.

According to Agassiz<sup>1</sup>, "*Charybdea bitentaculata*, Q. and G., is a *Campanella*<sup>2</sup>; *Ch. bicolor*, Q. and G., constitutes a distinct genus, Quoya, Ag.; *Ch. campanella*, Less., may also constitute a distinct genus."—"It remains doubtful to what genus Lesson's *Marsupialis flagellata*, from New Guinea, ought to be referred. It constitutes, probably, a distinct genus, on account of its tentacles."

Semper has given us precursory notices of some half-dozen species of *Charybdeidae* from the Philippine shores. The full details of his researches on these and other aculephs are looked forward to by many naturalists with great interest<sup>3</sup>.

<sup>1</sup> 'Contributions, vol. iv. p. 174.

<sup>2</sup> To which genus Agassiz also refers *Charybdea capitulum*, Q. & G. MS., De Bl. auct. See his explanatory note in 'Contr.' vol. iv. p. 169.

<sup>3</sup> Semper found three species round the Pelew Islands. The first was more than 7" high, scarcely 3" across. Wall of disk extraordinarily thick, almost cartilaginous, quite colourless and transparent. The four tentacles were torn off just beyond their broad cartilaginous basal portions. A wide depending veil. Margin weakly lobed: just above it, in as many depressions capable of being closed, were the four marginal bodies. Manubrium dependent, not lobed. Central cavity of disk small. Lateral pouches very broad from their origin: between two contiguous pouches the umbrellar and subumbrellar walls were in contact, giving rise to the false appearance of a canal. Gastric tentacles in four double groups about the central cavity. But one (not-sexual) example (Taf. xxxix. f. 9).

The disk of the second species was only  $1\frac{1}{2}$ " high,  $\frac{7}{8}$ " across. Tentacles extensible to about twice the length of disk, with narrow basal lobes. Veil more complicated than in last species, always elevated, and held in this position by four subumbrellar septa, each springing from the mid line of a swelling, on the umbrellar aspect of which is the depressed cavity, opening outwards, whence the marginal body arises: septa perpendicular to subumbrella, and extending across the veil, which by them is hindered from assuming a horizontal position. Into each of the four broad lateral pouches freely project two sexual laminae, of which one arises on either side of the partition between two adjacent pouches. Sexual products discharged through a single series of small openings, which run close beside the attached border of each genital plate and lead into the lateral pouches. Manubrium short, four-lobed. Central cavity wide, with four double groups of gastric tentacles (Taf. xxxix. f. 8).

A conspicuous nerve-ring exists in this and the preceding species. It pursues a zig-zag course (with eight octants), ascending slightly on either side of each marginal body, then descending and reaching its lowest point near the outer margin of the disk in the mid line of a tentacular lobe.

The third species, scarcely  $\frac{1}{2}$ " high, differs in many points essentially from the two others. Tentacles four, ringed with brown and yellow, destitute of basal lobes. Of a beautiful yellow tint were likewise the sexual laminae and four groups of gastric tentacles. No veil. Margin strongly eight-lobed, bearing a shorter rudimentary tentacle between every two principal tentacles. The four very broad lateral pouches interrupted in their inferior third by thickenings of the substance of the disk, constituting the floors of the small cavities for the four marginal bodies. Each of the eight sexual laminae much indented about the middle of its free margin. Only two examples were secured; so that some structural features could not be clearly determined (Reisebericht, 1863).

A fourth species, fished up in May during a voyage from Manila to Komblon, was very like one of the forms just noticed. From July to September Semper

We may now trace the attempts of successive zoologists to interpret *Charybdeida*. Linnæus records the species of *Plancus* in the *Systema Naturæ* (ed. xii. p. 1097)<sup>1</sup> as *Medusa marsupialis*. He is followed by Gmelin<sup>2</sup> and Modeer<sup>3</sup>.

In 1809 Péron and Lesueur found the genus *Carybdea*. It includes their new species (*C. periphylla*) together with that of *Plancus*. Lamarck<sup>4</sup>, Cuvier<sup>5</sup>, Goldfuss<sup>6</sup>, Schweigger<sup>7</sup>, the editors of the *Encyclopédie Méthodique*<sup>8</sup> and Latreille<sup>9</sup>, accept the new genus.

Eschscholtz does not cite Péron's new species or genus. He refers the species of *Plancus* to *Oceania* as *O. marsupialis*<sup>10</sup>.

Milne-Edwards suggests the affinity of *C. marsupialis* to *C. alata*, Reynaud, and *Bursarius cythereæ*, Lesson.

De Blainville<sup>11</sup> retains the genus of Péron, and gives in his *Atlas* the first copy of Lesueur's previously unpublished figure of *C. periphylla*. Coloured figures of this species (likewise copied from Lesueur's drawing) and of *C. marsupialis* (original) are added by Milne-Edwards to the large illustrated edition of '*Le Règne Animal*.'

Lesson<sup>12</sup> is the first to break up the genus of Péron. His *Carybdea* includes *C. periphylla*, while the species of *Plancus* is referred (as *M. planci*) to the new genus *Marsupialis*. This procedure is subsequently sanctioned by Agassiz. Lesson proposes the two tribes of

found at Komblon a fifth species with very peculiar genitalia. Each of these does not, as in other *Charybdeida*, form a continuous lamina freely projecting into its lateral pouch. The genitalia are constituted rather by the modified walls of diverticula from the pouches. They form, when mature, branched arbuscules, reaching far into the interior of the disk itself and splinted by processes of its gelatinous substance. In the lumen between these processes and their investing inner membrane [endoderm] the sexual products are developed.

Semper further notes a small aculeph, likewise relate and probably charybdeoid, with very complex marginal bodies. In this connexion he declares it unnatural to insist on establishing two primary groups of discoid *Medusæ* after the manner of Eschscholtz and his successors. Such divisions, based on single characters, arise from the delusive desire to thrust a straight-jacket of man's device upon the free creations of nature (*Reisebericht*, 1864).

<sup>1</sup> Tom. i. pars ii. (1767). Also ed. x. tom. i. p. 660 (1760).

<sup>2</sup> *Syst. Nat.* p. 3154.

<sup>3</sup> Whose work I have not seen. I take this reference from Eschscholtz.

<sup>4</sup> *Hist. nat. des animaux sans vertèbres*, tome ii. p. 496 (1816).

<sup>5</sup> *Le Règne animal*, tome iv. p. 59. "Lorsque ces animaux si simples prennent plus de concavité, leur surface inférieure devient intérieure, et peut être regardée comme un véritable estomac. Ce sont les *CARYBDEES*, Pér. Ceux où l'on ne voit à l'intérieur aucunes traces de vaisseaux, ne diffèrent proprement des *hydres* que par la grandeur." 1817.

<sup>6</sup> *Handbuch der Zoologie, erste Abtheilung*, p. 111. (1820).

<sup>7</sup> *Handbuch der Naturgeschichte der skelettlosen ungegliederten Thiere*, p. 500 (1820).

<sup>8</sup> *Histoire naturelle des Zoophytes ou Animaux Rayonnés*, faisant suite à l'*Histoire naturelle des Vers* de Bruguière; par MM. Lamouroux, Bory de Saint-Vincent et Eud. Deslongchamps, tome ii. p. 165 (1824).

<sup>9</sup> *Familles naturelles du règne animal*, p. 540 (1825).

<sup>10</sup> *System der Acalephen*, p. 101 (1829). De Blainville carelessly states that Eschscholtz places this species in *Æquorea*.

<sup>11</sup> *Manuel d'Actinologie*, p. 275, and *Atlas*, pl. xxxi. f. 1 (1834).

<sup>12</sup> *Prodrome* (1837); *Histoire naturelle des Zoophytes—Acalèphes* (1843).

CARYBDEÆ (*Carybdea*, *Obelia*) and MARSUPIALEÆ (*Marsupialis*, *Bursarius*, *Mitra*, *Eurybia*, *Cytæis*, *Campanella*, *Scyphis*). He has "associated with both of them several species which have not the remotest affinity with the type."

Lütken<sup>1</sup>, in a critical revision of the lower Medusæ, places *Carybdea* at the head of his family *Æginææ*. Burmeister<sup>2</sup> follows him.

Gegenbaur<sup>3</sup> differs both from Lesson and Lütken. He establishes the family *Charybdeidæ*, placing it with the higher Medusæ (his *Acraspeda*).

Fritz Müller<sup>4</sup> discusses the structure and classificatory value of the peculiar gastric tentacles of the higher Medusæ. In a later essay<sup>5</sup> he proposes the following arrangement.

ÆGINOIDA (*Æginææ*, Lütken).

a. Lower. CUNINA (*Ægina rosea*, Eschsch.); *Ægineta*; *Polyxenina*; *Æginopsis bitentaculata*.

b. Higher: *Charybdeidæ*. *Æginopsis laurentii* (?); *Ægina* (*citrea*); *Charybdea* (*marsupialis*); *Tamoya*; *Periphylla* (*Ch. periphylla*, Pér.).

The *Æginoida* here constitute an order of *Hydromedusæ*, equivalent to the orders *Siphonophora*, *Hydroida*, and *Acalephæ* (R. Leuckart, = *Phanerocarpæ*, Eschsch.). Fritz Müller has conscientiously endeavoured to group the results of his own investigations with every regard to the labours of his predecessors.

Agassiz (1862) more fully expresses somewhat similar opinions in the annexed tabular view (here condensed)<sup>6</sup>.

#### Order DISCOPHORÆ.

Suborder 1. RHIZOSTOMEÆ.

Suborder 2. SEMEOSTOMEÆ.

Suborder 3. HAPLOSTOMEÆ.

1st Family. THALASSANTHÆÆ, Lesson (= *Æginidæ*).

2nd Family. BRANDIDÆ, Agass.

*Dodecabostrycha*, Brandt.

*Quoyia*, Agass. (= *Carybdea bicolor*, Q. & G.).

3rd Family. CHARYBDEIDÆ, Less.

*Charybdea*, Less., after P. & L. (= *C. periphylla* only).

4th Family. MARSUPIALIDÆ, Less.

*Marsupialis*, Less. (= *M. planei*).

*Tamoya*, Fritz Müller.

*T. haplonema*.

*T. alata* (= *Carybdea alata*, Reynaud).

*Bursarius*, Less, 1836 (A misprint for 1830).

*Chiropsalmus*, Agass. (= *Tamoya quadrumana*).

5th Family. LUCERNARIADÆ, Johnston.

<sup>1</sup> Nogle Bemærkninger om Medusernes systematiske Inddeling, navnlig med Hensyn til Forbes's History of British naked-eyed Medusæ. Kjöbenhavn Vidensk. Medd. 1850, pp. 15-35. See p. 27.

<sup>2</sup> Zoonomische Briefe, erster Theil, p. 168 (1856).

<sup>3</sup> Op. cit. ('Versuch').

<sup>4</sup> Op. cit. (1859).

<sup>5</sup> Op. cit. (1862).

<sup>6</sup> From vol. iv. of his 'Contributions to the Natural History of the United States of North America.' The 'Second Monograph' (vols. iii. & iv.) is devoted to the Acalephs. Seeing the value and beauty of this admirably illustrated work, *facile princeps* among treatises on the Hydrozoa, one regrets that no living *Charybdeidæ* were studied by the author in person.



One cannot but regard the family of Brandtidæ as doubtful. Was not Brandt right in constituting his *Dodæcabostrycha*<sup>1</sup> a subgenus of *Chrysaora*? It differs from the latter, and resembles the *Charybdeidæ*, chiefly in so far as it is quadripartite. The genus *Quoyia*<sup>2</sup> is very obscure. As to the two other families of Agassiz, it seems inconvenient to revive Lesson's nomenclature. Fritz Müller is certainly right in retaining the generic name *Charybdea* for the first-discovered species of the group. In this he has the support of his predecessors (including Péron himself) as well as of most later writers, such as Gegenbaur, Gräffe, Kölliker and Claus. It may be true that Péron regarded his own species<sup>3</sup>, and not that of Plancus, as the type of his genus. In so doubtful a case the free action of the law of priority in nomenclature is certainly impeded. Agassiz and Haeckel are the only two zoologists who have given their sanction to Lesson's innovations. They have by so doing tended to promote confusion, and unnecessarily opposed themselves to a large working majority of their brethren. As to the genus *Chiropsalmus*, since Claus has shown *T. haplonema* to be a true *Charybdea*, it becomes a synonym of *Tamoya* proper.

Gegenbaur's family is adopted by myself<sup>4</sup>, by Victor Carus<sup>5</sup>, and at a later period by Schmarda<sup>6</sup>.

Fritz Müller, in a letter to Alexander Agassiz<sup>7</sup>, considers it highly probable that *Trachynema* may be the young of *Tamoya*. Subsequent researches of Mecznirow<sup>8</sup> show this view not to be tenable.

Haeckel, in 1866<sup>9</sup>, adopted Lesson's two families, *Charybdeidæ* and *Marsupialidæ*, as revised by Agassiz. He associated them in one order, *Elastomorphida*, under his subclass of *Trachymedusæ*<sup>10</sup>.

Haeckel is about to issue a great work on the Medusæ in the (postponed) first volume of the new 'Jenaische Denkschriften.' Meanwhile he has published his "System of the Medusæ"<sup>11</sup>. Of this group he recognizes two primary divisions, the second of which includes Gegenbaur's *Acraspeda* together with the *Lucernariæ*. These last make one order (*Scyphomedusæ*), while the *Phænerocarpæ* of Eschscholtz constitute another (*Discomedusæ*). Between *Scypho-* and

<sup>1</sup> See Brandt, in 'Mémoires de l'Acad. Imp. des Sc. de St.-Petersbourg,' besonders abgedruckt, p. 384, and Taf. xxix., xxx. (1838).

<sup>2</sup> Compare the remarks of Agassiz (Contr. iv. p. 173), and consult the original figure.

<sup>3</sup> This singular and but little understood form undoubtedly constitutes a distinct genus, for which Fritz Müller's name is the best. The species might henceforth be cited as *Periphylla péronii* (or *P. charybdeoides*).

<sup>4</sup> Natural-History Review, July, 1863, p. 350 and context.

<sup>5</sup> Handbuch der Zoologie, ii. p. 548 (1863).

<sup>6</sup> Zoologie, i. p. 232 (1871).

<sup>7</sup> Illustrated Catalogue of the North-American Acalephæ, p. 55 (1865).

<sup>8</sup> Whose Russian memoir I have not seen. I refer, therefore, to Leuckart's 'Bericht' for 1870-71, p. 163 (1874).

<sup>9</sup> Generelle Morphologie der Organismen, Bd. ii. p. lix.

<sup>10</sup> Equivalent to Haplostomeæ with Trachynemidæ of Alex. Agassiz.

<sup>11</sup> Sitzungsberichte der Jenaischen Gesellschaft für Medicin und Naturwissenschaft, für das Jahr 1878. Published in 1879. Haeckel's "System" was communicated on 26th July (pp. lxxviii-lxxx).

*Discomedusæ* Haeckel places the *Charybdeidæ*, arranged under two orders and five families, as follows:—

- CONOMEDUSÆ.
- Charybdeidæ*.
- Bursaridæ*.
- Chiropsalmidæ*.
- PEROMEDUSÆ.
- Periphyllidæ*.
- Pericryptidæ*.

Haeckel, therefore, as touching the genera *Charybdea* and *Periphylla*, would seem to have reverted to the nomenclature of Fritz Müller. His work is impatiently expected, since his opportunities of studying the Medusæ have been varied and extensive. The deep-sea forms obtained during the voyage of the 'Challenger' have also been intrusted to him. We do not know what new *Charybdeidæ* he has investigated, or whether he is justified in his apparently extreme subdivision of this group. So copious and diversified an assemblage as the *Phanerocarpæ* will probably by most zoologists continue to be regarded as of higher rank than either of the two moieties of Gegenbaur's single family, notwithstanding that the *Charybdeidæ* of the latter are structurally more modified and more numerous than Gegenbaur, writing in 1856, could have supposed.

Before instituting his own researches on *Charybdea*, Claus<sup>1</sup> reviewed with care what had been done by others. While pointing out a number of discrepancies, he shows the true significance of the structure of these Medusæ, and demonstrates their affinities with great clearness. His results, critical and original, are well epitomized in his 'Zoologie'<sup>2</sup>. He neglects many ill-defined species, and thus arranges the few which have hitherto been properly described and figured.

#### Suborder LOBOPHORA s. MARSUPIALIDA.

##### Family CHARYBDEIDÆ.

Genus *Charybdea*, Pér.

*Ch. marsupialis*, Pér. & Le S.

*Ch. haplonema*, Fr. Müll.

Genus *Tamoya*, Fr. Müll.

*T. quadrumana*, Fr. Müll.

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<sup>1</sup> Studien über Polypen und Quallen der Adria. I. Acalephen (*Discomedusen*), 1877. Reprinted from 'Wiener Denkschriften,' Band xxxviii. See pp. 53–60.

<sup>2</sup> Grundzüge der Zoologie, 4te Auflage, Band i. erste Lieferung, pp. 287–289 (1879, but issued in 1878).

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<sup>1</sup> Busk was the first English naturalist to give a more accurate and critical account of the marginal bodies of the Medusæ. See his "Observations on certain points in the Anatomy of a species of *Thaumantias*," in Trans. Micr. Soc. London, vol. iii. p. 22 (1852).

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### 5. On a Four-horned Chamois.

By EDWARD R. ALSTON, F.L.S., F.Z.S., &c.

[Received December 10, 1879.]

Mr. Sclater has asked me to describe the monstrous horns of *Rupicapra tragus* (Gray) which he exhibited at the meeting of the 18th November on behalf of Mr. Rowland Ward<sup>1</sup>.

This interesting specimen has been a good deal injured and carefully repaired; but fortunately the frontal sinuses and bases of the horn-cores are uninjured, so that there can be no doubt as to the genuineness of the deformity. The four horns are all perfectly well-formed and symmetrical, the normal pair measuring about 8·75 inches along their anterior curve, and indicating that the animal was an adult male, at least five years old. The abnormal horns grow from close to the bases of the usual pair, on the outside and a little to the rear; they are equally well formed, but are less curved and much shorter, measuring 5 and 5·25 inches respectively. The cores of the normal and abnormal horns are continuous at their bases, separating a little above the level of the frontal bone; and the air-sinuses extend into both of them; so that the deformity really consists in a bifurcation of the core, each duplication being covered by a distinct horn-sheath.

I have not been able to find any record of a similar abnormality in the Chamois in the works of Swiss or German zoologists; nor have I ever seen any exactly similar monstrosity in any other animal. In the "Many-horned Sheep" of the Hebrides the attachment of the supplementary horns is usually very irregular, and does not seem to be due to duplication of the cores. Colonel Godwin-Austen, however, informs me that in Kishtwar (a district south-east of Kashmir) the natives carefully preserve a breed of four-horned sheep, in which

<sup>1</sup> Cf. *suprà*, p. 666.

the horns are very symmetrical, as a rule, and are set somewhat as in the present specimen.

Unfortunately nothing can be learned of the history of these



Abnormal horns of Chamois.

curious horns, excepting that they were bought by Captain Towneley Parker at Nürnberg. Probably the animal was killed in the Bavarian highlands, where Chamois are still tolerably numerous<sup>1</sup>.

6. On certain obscure Species of Siberian, Indian, and Chinese Thrushes. By HENRY SEEBOHM.

[Received December 16, 1879.]

(Plate LXIV.)

In the year 1833 Tickell described (J. A. S. Beng. ii. p. 577) a Thrush from India under the name of *Turdus unicolor*. In 1837 Gould described the same species (P. Z. S. v. p. 136), and, curiously enough, gave it the same name. In 1842 Blyth, apparently thinking it impossible that an accidental coincidence of name could be accom-

<sup>1</sup> König-Warthausen, Jahresb. Ver. Naturk. Württ. 1875, p. 314.

panied by a real coincidence of species, proposed (J. A. S. Beng. xi. p. 460) the name of *Turdus modestus* as a substitute for *Turdus unicolor*, "Gould, nec Tickell" apud Blyth. In 1847 Blyth discovered that he had fallen into precisely the same blunder that he had tried to correct in Gould; for the name *T. modestus* had already been applied by Eyton, in 1839 (P. Z. S. vii. p. 103), to a different species of Thrush. Blyth accordingly proceeded (J. A. S. Beng. xvi. p. 144) to give a third name, *Geocichla dissimilis*, to this species. In doing so, however, he further complicated the question by adding to his new name the description of the immature male or female of a new species which he erroneously imagined to be the adult male of *T. unicolor*, Gould.

In 1850 Bonaparte described what he considered to be a new species of Thrush from a skin in the Leyden Museum labelled "Central Asia." He gave it (Consp. Gen. Av. i. p. 273) the name of *Turdus pelios*, but afterwards, in 1854 (Compt. Rend. xxxviii. p. 5), carelessly identified an Abyssinian Thrush (*Turdus icterorhynchus*, Pr. Würt.) with his description of *P. pelios*, and needlessly threw doubt on the correctness of the Leyden locality. The skin in the Leyden Museum is undistinguishable from the female or immature male which Blyth described as *T. dissimilis*.

After a lapse of twelve years Jerdon, in his 'Birds of India,' further complicated matters by erroneously identifying *T. dissimilis* (Blyth) with *T. cardis*, Temm., including it in his work (i. p. 521) as *Turdulus cardis* (Temm.).

The following year Scater described (Ibis, 1863, p. 196) a new species of Thrush from Amoy as *Turdus hortulorum*, the male (doubtless immature) and female of which are undistinguishable from *T. dissimilis* (Blyth).

Seven years later Cabanis received a Thrush from Dr. Dybowski, collected in the valley of the Amoor (likewise undistinguishable from *T. dissimilis* (Blyth)), and identified it with *T. pelios*, Bonap., pointing out (Journ. Orn. 1870, p. 238) the error into which Bonaparte afterwards fell.

Further complications now followed thick and fast. In 1871 Hume described a new Thrush from Assam (Ibis, p. 411) as *Geocichla tricolor*. In 1873 Swinhoe described a new Thrush from Cheefoo (Ann. Nat. Hist. ser. 4, vol. xii. p. 374) as *Turdus campbelli*. In the following year, forgetting that he had described it in the 'Annals,' he redescribed the same skin in 'The Ibis' (1874, p. 444, pl. xiv.) as *Turdus chrysopleurus*.

My first attempt to unravel this complicated tangle of facts was to draw the inference that whereas in the nearly allied species *T. cardis*, Temm., *T. obscurus*, Gmel., *T. pallidus*, Gmel., and *T. unicolor*, Tick., the females and immature males have streaks or spots on the throat, which disappear in the fully adult male, it was highly probable that the fully adult male of *T. dissimilis*, Blyth, would also have an unspotted throat. Having arrived at this conclusion, it was an easy step to identify *T. campbelli*, Swinh., or *T. tricolor* (Hume), as the fully adult male. Hume's description

was that of a somewhat darker bird than Swinhoe's type; but finding in the Museum at Philadelphia a second skin agreeing precisely with the latter (obtained, I was informed, by the Perry Expedition to Japan), I cut the Gordian knot by assuming Swinhoe's bird to be the normal adult male and Hume's to be a partially melanistic form not uncommon among Thrushes. Since then the return of Mr. Wardlaw Ramsay from Afghanistan has placed the Tweeddale collection within reach; and I find in it the skin of a Thrush from Assam (which I propose to be figured as an illustration to this paper) which apparently agrees with Hume's description of *G. tricolor*; and I also hear that Captain Elwes possesses two skins from the same locality. These facts have obliged me to alter my opinion as to the identity of the Indian with the Chinese specimen. I am now inclined to identify Hume's bird as the fully adult male of *T. dissimilis* (Blyth). Both Hume's type and the skins in the Tweeddale collection were shot in Assam; and in 'The Ibis' for 1872 (p. 136, pl. vii.) is an excellent figure of the immature male or female of *T. dissimilis* (Blyth), the original of which was shot by Colonel Godwin-Austen in the same locality. The two species will therefore stand as follows:—

**TURDUS DISSIMILIS (Blyth). (Plate LXIV.)**

*Geocichla dissimilis*, Blyth, J. A. S. Beng. 1847, p. 144.

*Turdulus cardis* (Temm.), apud Jerdon, B. India, i. p. 521 (1862).

*Geocichla tricolor*, Hume, Ibis, 1871, p. 411.

Adult male with the entire head, neck, and throat dark slate-grey, nearly black, shading into paler slate-grey on the rest of the upper parts. Axillaries, under wing-coverts, sides of the breast, and upper portion of the flanks brilliant orange-chestnut, shading into brown on the lower portion of the flanks, and into white on the centre of the breast, belly, and under tail-coverts.

*Female and immature male.* Upper parts differing from the adult male in being pale slate-grey suffused with russet-brown on the forehead, and with olive-brown on the centre of the back. Throat nearly white in the centre, the feathers on the sides of throat and chest having dark-brown fan-shaped terminal spots. Rest of the plumage similar to that of the adult male.

*Hab.* Assam, occasionally straying westward as far as Calcutta.

**TURDUS HORTULORUM, Selater.**

*Turdus pelios*, Bonap. Consp. Gen. Av. i. p. 273 (1850, nec plur. auct.)?.

*Turdus hortulorum*, Selater, Ibis, 1863, p. 196.

*Turdus campbelli*, Swinhoe, Ann. Nat. Hist. 1873, xii. p. 374.

*Turdus chrysopleurus*, Swinhoe, Ibis, 1874, p. 444.

Until a fully adult male has been obtained from Southern Siberia, we can never be absolutely sure to which of the two species Bonaparte's name properly belongs; but the bird from the Amoor is more likely to be identical with one from China than with one from Assam. According to the new-fashioned system adopted by the

extreme Ritualist party in ornithology, who attempt to carry out the Stricklandian code regardless of consequences, Bonaparte's name would hang *in terrorem* over Sclater's, to be substituted for it as soon as it could be proved that it certainly referred to the same species; or, following the practice of the blindest followers of this unfortunate innovation, Bonaparte's name would at once be given the benefit of the doubt, regardless of the fact that it had been extensively applied to a different species. I cannot for a moment lend myself to such ornithological immorality, and must look upon Bonaparte's name as one tainted for ever, and debarred for the future from being used for any species of Thrush.

In the fully adult male of *T. hortulorum*, Sclater, the general colour of the upper parts is a dull slate-grey, shading on the sides of the neck into a very pale slate-grey on the throat and chest. The axillaries, under wing-coverts, and flanks are brilliant orange-chestnut, shading into white on the centre of the belly and under tail-coverts.

The female and immature male are undistinguishable from those of *T. dissimilis* (Blyth).

## 7. On the Mollusca of H.M.S. 'Challenger' Expedition.—

The CÆCIDÆ, comprising the genera *Parastrophia*, *Watsonia*, and *Cæcum*. By the MARQUIS DE FOLIN. With a Prefatory Note by the Rev. ROBERT BOOG WATSON, B.A., F.R.S.E., F.L.S., &c. (Published by permission of the Lords Commissioners of the Treasury.)

[Received November 25, 1879.]

[The Cæcidæ are a group of shallow-water Mollusca, enormously numerous in individuals but hitherto poor in species. As was natural, very few indeed presented themselves in the 'Challenger' dredgings; and these I had great pleasure in intrusting to one who has so specially made the group his study as the Marquis de Folin. His acquaintance with the subject in general, and his own vast collection of specimens gathered from every quarter of the globe, are the pledges that in what he has now produced nothing known on the subject has been overlooked; and even those who may hesitate to accept in full his classification will recognize both the general value of this monograph, and the extraordinary perfection with which he has delineated the specimens.]

ROBERT BOOG WATSON.]

### 1. PARASTROPHIA CHALLENGERI, n. sp.

St. 186. Sept. 8, 1874. Lat. 10° 30' S., long. 142° 18' E. Wednesday Island, Cape York. 8 fms. Coral-sand. Temperature of sea at the surface 77°·2 F. One specimen.

*Testa minuta, tubularis, tricurvata, subopaca, alba, nitida, minu-*



*tissime et irregulariter transversim striata; apicem versus paululo tumidula. Apertura obliqua, haud marginata.*

Length 2·3 mm. Breadth 0·2 mm.

The apex of this specimen has been broken and restored; so that its original form is somewhat obliterated. The species presents the usual slight swelling at the beginning of the curve, a little way from the apex. It has three curvatures. The aperture is oblique. From *P. asturiana* (see 'Les Fonds de la Mer,' vol. i. pp. 174 and 218, pl. xxix. fig. 7) it differs in that the shell here is shorter, the curves stronger, while the annular striations are much finer and are differently arranged. Its form distinguishes it from *P. cornucopiæ* ('Les Fonds,' &c. vol. i. pp. 122, 174, 218. pl. xv. figs. 7-9). The absence of the characteristic apex is a feature noticeable here, as well as in some specimens of *P. asturiana* which yet present all the other characteristics of the genus. In a shell so sharp at the point a fractured apex is not wonderful; it doubtless occurs through accident; and the injury is repaired, and the traces of it concealed, by deposition of shelly matter.

## 2. STREBLOCERAS SUBANNULATUM, n. sp.

July 1875. Reefs off Honolulu. 40 fms. Three specimens.

*Testa minuta, bicurvata, vitrea, diaphana, nitida; nucleo spirali, obliquo; anfractibus duobus; postea testa tubularia, latitudine accrescens, curvam duplicem sequens, transversim subannulata, annulis latis, minutissime expressis, subacutis, late separatis. Apertura obliqua.*

Length 3 mm. Breadth 0·5 mm.

These three specimens are the first living representatives of the genus; and that they really belong to it is obvious, since the nucleus exhibits two or two and a half whorls and is placed at the side, not in the central plane of the shell—the position occupied by the nucleus in *Cæcum* with as many whorls, and in *Parastrophia* with only half a whorl; and this is a distinction of great importance. Below the nucleus the shell increases steadily in breadth, and as it lengthens takes a curve in two planes. The shell is vitreous, translucent, glossy, and thin, ornamented by broad, remote, transverse slightly sharp undulations, which can hardly be reckoned rings, being so faint as only to be visible under the microscope. This ornamentation, slight as it is, is very characteristic. The mouth is oblique, with the obliquity turned towards the plane of the apex of the nucleus. This is a feature of some importance in the family of Cæcidæ, the direction of the oblique mouth being constant in the well-known genera *Cæcum* and *Meioceras*; and the same may be affirmed of *Parastrophia*.

## WATSONIA, nov. gen.

*Testa probabiliter primum nucleosa, postea tubularia, decollata, viz bicurvata, conica; apertura orbicularis, valde obliqua, valide circumdata.*

The three specimens here under consideration have all the

appearances of belonging to the family of the Cæcidæ. Their form is very peculiar: obviously they have lost the embryonic shell, and the opening thus made has been closed by a septum; but, unlike the case in *Cæcum*, only a single decollation has taken place here, leaving the shell acutely conical. On this feature the new genus is founded, which I have dedicated to the Reverend Robert Boog Watson.

### 3. WATSONIA ELEGANS, n. sp.

St. 186. Sept. 8, 1874. Lat.  $10^{\circ} 30'$  S., long.  $142^{\circ} 18'$  E., Wednesday Island, Cape York. 8 fms. Coral-sand. Surface temperature  $77^{\circ} \cdot 2$  F. Three specimens.

*Testa adulta, tubularis, conica, leviter biarcuata, subflava, nitida, annulis regularibus, rotundatis, valde obliquis, minimis, paulo expressis, crebris, elegantissime cincta; apertura valde obliqua, annulo lato crasso valde prominente circumdata.*

Length 2.5 mm. Breadth 0.5 mm.

This very remarkable and elegant form is extremely conical. It starts with a rather regular curve, and towards the mouth bends suddenly in the same direction as the very oblique aperture. It is yellowish glossy and very beautifully ornamented with numerous small, transverse, oblique rings slightly expressed, but well rounded, and though close-set yet well defined. The very oblique mouth is strengthened by a large and very prominent ring, which indicates the adult condition of the shell. This fact of the shells being full-grown implies that no further decollation was to take place, while the fineness of the pointed apex indicates that only one has occurred already. The septum of the apex is smooth, with a minute, scarce visible mamillation in one specimen, which is even less marked on the second. The third is broken.

All appearances point to the Cæcidæ as the true position of this beautiful and interesting little shell; but even should this prove a mistake, it will still constitute in any case a remarkable genus.

### 4. CÆCUM LINEICINCTUM, n. sp.

St. 24. March 25, 1873. Lat.  $18^{\circ} 38' 30''$  N., long.  $65^{\circ} 5' 30''$  W. Off Culebra Island, St. Thomas, Danish West Indies. 390 fms. Coral-mud. One specimen.

*Testa subcylindrica, parum arcuata, albida, subopaca, sublacvis, nitida, aperturam versus lineis transversis cincta. Apertura? Septo mucronato, leviter circumdato.*

Length 2.5 mm. Breadth 0.7 mm.

The solitary specimen of this species is in bad condition; but the shell is obviously glossy, nearly opaque, whitish and almost smooth, with a few strong transverse lines like minute rings towards the mouth, which is broken. The mucronated septum has possibly been much larger; for it seems eroded. Like all dactyliform septa it is surrounded by a portion of the tube which projects so as to protect it. It is the first smooth or nearly smooth *Cæcum* I have

seen with a septum of this character ; and, misled by this feature, I at first considered it to be a specimen of *C. reversum*, Carp. ; but that species belongs to his group *Fartulum*, with which the specimen in hand has nothing to do. I believe it to be a new species.

5. CÆCUM ATTENUATUM, n. sp.

Sept. 8, 1874. Flinders Passage, Cape York. 7 fms. Nine specimens.

*Testa, quoad genus, mediocris, conica, arcuata, elongata, alba, parum nitida, subopaca, annulis numerosis crebris, haud seu vix expressis, cincta, aperturam versus paululo latior vel dilatata. Apertura vix obliqua, haud marginata, parum contracta, septo valido mamillato-ungulato, margine laterali bicurvato, dorsali gibboso.*

Length 1·8 mm. Breadth 0·4 mm.

A very curious species, very small, conical, curved, long in proportion to its breadth, slightly glossy, opaque. It looks smooth ; but under a lens it appears ornamented with numerous close-set, scarcely projecting rings. Towards the mouth the shell broadens a little and then contracts, thus forming a peristome which is slightly oblique and has no ledge. The septum is enormous, and in form is at once mamillated and unguled. Its dorsal protuberance or hump, when looked at from behind, rises in an equable curve from either side.

6. CÆCUM SEPIMENTUM, de Folin.

July 1875. Reefs off Honolulu, 40 fathoms. Many specimens.

Var. ARCUATA, de Folin.

St. 172. July 22, 1874. Lat. 20° 58' S., long. 175° 9' E. Tongatabu. 18 fms. Coral. Surf. temp. 75° F. One specimen.

Sept. 28, 1875. Tahiti Harbour. 20 fms. Two specimens.

De Folin, *Les fonds de la mer*, vol. i. p. 84, pl. vi. fig. 7.

A species described from specimens dredged at Mauritius. The numerous specimens from Honolulu are quite of the typical form. The var. *arcuata* is shorter and more bent. The specimen from Tongatabu is somewhat broader and has thicker rings than those from Tahiti.

7. CÆCUM, n. sp.

July 1875. Reefs off Honolulu. 40 fms. One broken specimen.

Probably a third of the shell is broken away. It is ornamented with strong and pretty regular rounded transverse rings, which are parted by hollows equally broad and rounded with the rings. The septum is regularly and hemispherically mamillated with a coarsely tubercled surface. It seems to be a new species.

8. CÆCUM CHINENSE, de Folin.

St. 186. Sept. 8, 1874. Lat. 10° 30' S., long. 142° 18' E. Wednesday Island, Cape York. 8 fms. Coral-sand. Surf. temp. 77°·2 F. Two specimens.

De Folin, *'Les Fonds de la Mer,'* vol. i. p. 80, pl. ix. figs. 3, 4.

Compared with the original types, the 'Challenger' specimens have the transverse striations stronger, more regular, and more prominent, but they certainly belong to this species.

9. *CÆCUM SUBFLAVUM*, n. sp.

St. 186. Sept. 8, 1874. Flinders Passage, Cape York. 7 fms. One specimen.

*Testa minuta, subcylindrica, paulo arcuata, primum albida, dein subflava, nitida, strigis irregularibus plus minusve expressis, transversim cincta, aperturam versus tumida; inflatio rotundata, transversim sulcata. Apertura leviter obliqua, tumore circumdata; septo haud elevato, bimamillato, seu mamillato-ungulato; margine laterali undulato, paululo convexo, fere plano decollationis parallelo.*

Length of entire shell 2.5 mm., length of the adult part 1.8 mm. Breadth 0.4 mm.

In this specimen the adolescent shell is still united to the full-grown adult, whose septum can be recognized within, through the thin walls of the younger shell. A slight contraction of the tube indicates the place where decollation was about to take place. Such specimens are occasionally to be met with, and are very interesting.

The species belongs to the pretty numerous group of smooth *Cæca*, all more or less nearly connected.

Among these may be mentioned in particular *C. auriculatum*, *C. bimamillatum*, *C. circumvolutum*, *C. massiliense*, *C. modestum*, *C. strigosum* (see 'Les Fonds de la Mer'); but from them all this species differs in the mouth or in the septum.

In colour it is whitish near the apex and slightly yellowish towards the mouth. It is strongly but irregularly striated transversely. Near the mouth, which is little oblique, there is a rounded transversely furrowed varix bevelled off to a thin inner edge. The septum is bimamillated, having a slightly larger and higher swelling on the side which lies near the concave curve of the shell.

10. *CÆCUM SUCCINEUM*, n. sp.

St. 186. Sept. 8, 1874. Flinders Passage, Cape York. 7 fms. Nine specimens.

*Testa minuta, subcylindrica, parum elongata, arcuata, flava vel albida, subopaca, nitidissima, lævis sed subannulata, aperturam versus dilatata, annulo lato, rotundato, prominente terminata. Apertura paululo obliqua, haud contracta, septo subplanato, parum expresso, vix conspicuo.*

Length 1.9 mm. to 2 mm. Breadth 0.4 mm.

This species is nearly cylindrical, a good deal curved, rather long, amber-coloured or whitish or yellowish, very glossy, nearly opaque. In some lights it looks as if girt by a series of very small rings; but there is no real swelling nor grooving, and the appearance of rings is probably only some effect of reflection in connexion with the texture of the shell. There is a broad and high ring round the mouth.

The septum is nearly flat, and projects so slightly as to be barely visible from the side.

This species may possibly be only a variety of *C. subflavum*; but the difference in the septum seems to individualize it.

11. CÆCUM MICROCYCLOS, n. sp.

St. 186. Sept. 8, 1874. Flinders Passage, Cape York. 7 fms. Fourteen specimens.

*Testa subconica, elongata, arcuata, flavescent, nitidissima, sub-opaca, annulis multis parum expressis cincta, aperturam versus paulo dilatata. Apertura haud obliqua, nec contracta, haud marginata; septo subangulato, submucronato, aliquando bimucronato.*

Length 2 mm. Breadth 0.3 mm.

This beautiful species is long in proportion to its breadth; it is conical, rather bent, yellowish, very glossy and nearly opaque. The sculpture consists of numerous small rings, very close-set and slightly prominent. It is sometimes as smooth as *C. succineum*, from which it differs in its greater length, its more conical form, and the shape of its septum. The mouth is normal in its relation to the axis; it has no marginal ring; and the shell expands towards it regularly without any contraction. The septum is somewhat pointedly subangulated, presenting occasionally two or three very similar protuberances.

12. CÆCUM ELEGANTISSIMUM, Carp.

Feb. 10, 1873. Off Tenerife. 70 fms. Six specimens.

These specimens present slight differences, but belong unquestionably to this somewhat variable species.

13. CÆCUM REGULARE, Carp.

St. 122. Sept. 10, 1873. Lat. 9° 5' S., long. 34° 50' W. Off Pernambuco. 350 fms. Mud. One specimen.

This specimen differs a little from Carpenter's description of *C. regulare*, but not enough to justify its erection into a separate species.

14. CÆCUM EXILE, n. sp.

St. 172. July 22, 1874. Lat. 20° 58' S., long. 175° 9' W. Tongatabu. 18 fms. Coral. One specimen.

*Testa minima, paululo subconica, arcuata, vitrea, diaphana, tenuis, nitida, primum annulata, dein transversim striata, annulis minimis vix expressis, aperturam versus paululo inflata. Apertura parum contracta, vix obliqua, marginata, septo vix elevato, submamillato, apice in medio sito.*

Length 1.5 mm. Breadth 0.3 mm.

This pretty little species is somewhat broken at the mouth, but is otherwise perfect. It is slightly conical, crystalline, translucent, glossy and very thin. On the upper part there are rings, which though scarcely expressed are quite distinct under a magnifying

glass. At about one third from the apex they are replaced by irregularly disposed striations. Towards the mouth the shell is slightly dilated; but just at the edge it is faintly constricted and then even more faintly reflected. The septum is minute and very slightly elevated in the form of a centrally mamillated button.

The species differs from *C. bipartitum* ('Les Fonds de la Mer,' vol. i. p. 185, pl. xxv. figs. 9, 10) from Mexico, in size, thinness of shell, form of mouth and septum, and in sculpture. From *C. semicinctum* (Les Meleaginicoles, p. 42; Les Fonds de la Mer, p. 8) it differs in size, thinness, arrangement and form of the rings, and in the form of its septum.

15. CÆCUM CRYSTALLINUM, n. sp.

July, 1875. Reefs off Honolulu. 40 fms. One specimen.

Length ? Breadth 0·3 mm.

An imperfect specimen, the upper part being broken off. It is evidently a new species, though nearly related to *C. striatum* (Fonds de la Mer, vol. i. pp. 49, 170, pl. v. fig. 3), from which it differs in that the shell towards the mouth expands and is thereafter contracted so as to form a minute gorge, with a slightly reflected lip. At first sight it resembles *C. glabriforme*, Carp. (*Brochina*); but it is straighter, and the texture of the shell is different, exhibiting under the microscope fine longitudinal striations. Though unable, from its imperfect condition, to offer a full description, the specimen is so clearly a new species that I venture to attach to it the name I have given above.

# APPENDIX.

## LIST OF ADDITIONS TO THE SOCIETY'S MENAGERIE

DURING THE YEAR

1879.

- Jan. 1. 2 Californian Quails (*Callipepla californica*), ♂ and ♀. Presented by Mr. W. Turquand.
6. 1 Bar-winged Rail (*Rallina pœciloptera*). Purchased. See P. Z. S. 1879, p. 108.
7. 1 Great Eagle-Owl (*Bubo maximus*). Deposited.
9. 1 Macaque Monkey (*Macacus cynomolgus*), ♀. Presented by Mr. W. Trent.
10. 1 Green Monkey (*Cercopithecus callitrichus*), ♀. Presented by Mr. Carroll.
- 1 Common Marmoset (*Hapale jacchus*). Presented by Mrs. Currey.
12. 1 Triangular Spotted Dove (*Columba guinea*). Presented by Col. F. C. Hassard, C.B.
13. 2 Cuming's Octodons (*Octodon cumingi*). Born in the Menagerie.
14. 1 Macaque Monkey (*Macacus cynomolgus*). ♀. Presented by D'Orpen, Esq.
15. 1 Black-faced Spider Monkey (*Ateles ater*). Presented by the Earl Brownlow, F.Z.S.
- 1 Common Seal (*Phoca vitulina*). Presented by the Earl of Hopetoun.
16. 1 Dufresne's Amazon (*Chrysotis dufresniana*). Presented by Mrs. T. Smith.
- 1 Yellow-fronted Amazon (*Chrysotis ochrocephala*). Presented by Mrs. T. Smith.
- 1 Tuberculated Lizard (*Iguana tuberculata*). Presented by Dr. A. Stradling.
- 3 Merrem's Snakes (*Liophis merremi*). Purchased.
- 1 Darwin's Amphibæna (*Amphisbæna darwini*). Purchased. See P. Z. S. 1879, p. 146.
- 1 Superb Tanager (*Calliste fastuosa*). Purchased.
- 1 Blue Creeper (*Cacæba cyanea*). Purchased.
17. 1 Noddy Tern (*Anous stolidus*). Presented by Morris H. Smyth, Esq., R.N. From Ascension.
21. 2 Cuming's Octodons (*Octodon cumingi*). Deposited.
23. 1 Entellus Monkey (*Semnopithecus entellus*). Presented by J. Mills, Esq., R.H.A.
- 2 Prairie-Marmots (*Cynomys ludovicianus*), ♂ and ♀. Presented by Miss Agneta B. Dykes.
- 4 Common Gulls (*Larus canus*). Presented by F. Cresswell, Esq.

- Jan. 23. 1 Common Wigeon (*Marca penelope*), ♀. Presented by F. Cresswell, Esq.
- 4 Grey Plovers (*Squatarola helvetica*). Presented by F. Cresswell, Esq.
- 3 Knots (*Tringa canutus*). Presented by F. Cresswell, Esq.
- 1 Dunlin (*Tringa cinchus*). Presented by F. Cresswell, Esq.
24. 2 Coypu Rats (*Myopotamus coypus*). Purchased. From Buenos Ayres.
- 1 Brown Coati (*Nasua nasica*). Purchased. From Buenos Ayres.
- 2 Violaceous Night-Herons (*Nycticorax violaceus*). Purchased. From Bahia.
- 1 Great Frigate-bird (*Fregata aquila*). Purchased. From Pernambuco.
- 1 Chilian Sea-Eagle (*Geranoaëtus melanoleucus*). Purchased. From Buenos Ayres.
- 1 Diuca Finch (*Diuca grisea*). Purchased. From Buenos Ayres.
- 1 Brazilian Blue Grosbeak (*Guiraca cyanea*). Purchased. From Mexico.
- 1 White-faced Tree-Duck (*Dendrocygna viduata*). Purchased. From Rio de Janeiro.
- 2 Saira Tanagers (*Pyranga saira*). Purchased. From Buenos Ayres.
- 2 Dark Green Maize-eaters (*Pseudoleistes virescens*). Purchased. From Buenos Ayres.
- 1 White-bellied Thrush (*Turdus albiventris*). Purchased. From Bahia.
- 2 Pileated Jays (*Cyanocorax pileatus*). Purchased. From Buenos Ayres.
- 1 Ariel Toucan (*Ramphastos ariel*). Purchased. From Bahia.
- 1 Blue-and-yellow Macaw (*Ara ararauna*). Presented by F. G. J. Lillingston, Esq., R.N.
27. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Presented by E. E. Barclay, Esq.
- 1 Grey Ichneumon (*Herpestes griseus*). Presented by B. Baverstock, Esq.
- 2 Goldfinches (*Carduelis elegans*). Presented by H. A. Macpherson, Esq.
- 1 Giraffe (*Camelopardus giraffa*), ♂. Purchased. From Nubia. See P. Z. S. 1879, p. 108.
28. 1 Golden-naped Amazon (*Chrysotis auripalliat*). Presented by Mrs. H. A. Hopkins.
- 4 River Jack Vipers (*Vipera rhinoceros*). Received in exchange.
- 1 Golden-fronted Parrakeet (*Protoperys tuipara*). Received in exchange.
- 1 American Tantalus (*Tantalus loculator*). Received in exchange.
- 1 Rough Terrapin (*Clemmys punctularia*). Received in exchange.
- 2 Northern Buzzards (*Buteo borealis*). Received in exchange.
29. 1 Weeper Capuchin (*Cebus capucinus*). Presented by W. Fridrick, Esq.
30. 3 Canada Geese (*Bernicla canadensis*). Presented by W. Bonorton, Esq.
- 1 Macaque Monkey (*Macacus cynomolgus*), ♀. Presented by Mrs. Eardley Holt.
31. 2 White-throated Capuchins (*Cebus hypoleucus*). Presented by Jas. Backhouse, Esq.



- Feb. 1. 1 Short-tailed Wallaby (*Halmaturus brachyurus*). Presented by G. Bowen, Esq.
- 1 Black-winged Peafowl (*Pavo nigripennis*). Presented by the Hon. A. S. G. Canning.
2. 1 Common Gannet (*Sula bassana*). Presented by Edgar T. Adams, Esq.
3. 1 Geoffroy's Dove (*Peristera geoffroyi*). Bred in the Gardens.
4. 1 Purple-crested Touracou (*Corythaix porphyreolopha*). Presented by the Rev. J. A. Gould, F.Z.S. See P. Z. S. 1879, p. 218.
5. 2 Slender Loris (*Loris gracilis*). Presented by Leith Bonhôte, Esq.
7. 1 Common Rhea (*Rhea americana*). Presented by Major Venables.
10. 2 Yellow-billed Sheathbills (*Chionis alba*). Purchased.
11. 1 Ring-tailed Lemur (*Lemur catta*), ♀. Presented by Thos. G. Mann, Esq.
12. 1 Cape-Hyrax (*Hyrax capensis*). Presented by Mr. A. H. Jamrach.
- 1 Yellow-footed Rock-Kangaroo (*Petrogale xanthopus*). Born in the Menagerie.
- 1 Garnett's Galago (*Galago garnetti*). Purchased.
13. 1 Wood-Owl (*Syrnium aluco*). Presented by Mrs. George Blagden.
14. 1 Common Gull (*Larus canus*). Presented by Harry W. Preston, Esq.
- 2 Black-headed Gulls (*Larus ridibundus*). Presented by Harry W. Preston, Esq.
17. 2 Indian Barred Doves (*Geopelia striata*). Presented by Capt. H. Braddick.
- 1 Chinese Turtle Dove (*Turtur chinensis*). Presented by Capt. H. Braddick.
- 1 Common Hare (*Lepus europæus*). Presented by Mr. Alfred Withers.
- 1 Tayra (*Galictis barbatus*). Purchased.
18. 2 Prairie-Marmots (*Cynomys ludovicianus*). Received in exchange.
- 1 Wizlizen's Lizard (*Crotaphytus wizlizeni*). Presented by Lieut.-Col. Ralph Vivian, F.Z.S. See P. Z. S. 1879, p. 218.
19. 2 Cardinal Grosbeaks (*Cardinalis virginianus*). Purchased.
- 3 Australian Wild Ducks (*Anas superciliosa*). Purchased.
- 3 Golden Tree-Frogs (*Hyla aurea*). Purchased.
- 2 White's Tree-Frogs (*Pelodytes cærulea*). Purchased.
- 1 Blue-cheeked Amazon (*Chrysotis cæligena*). Purchased. See P. Z. S. Feb. 17, 1880.
20. 1 Spotted Eagle Owl (*Bubo maculosus*). Purchased.
- 1 Many-zoned Hawk (*Melierax polyzonus*). Purchased.
21. 1 Green Monkey (*Cercopithecus callitrichus*). Presented by J. Douglas Murray, Esq.
- 1 Bennett's Wallaby (*Halmaturus bennetti*). Presented by W. E. Windus, Esq.
- 1 Russian Bullfinch (*Pyrrhula rubicilla*). Purchased.
22. 2 Grand Galagos (*Galago crassicaudatus*). Purchased.
25. 1 Impeyan Pheasant (*Lophophorus impeyanus*), ♀. Received in exchange.
- 2 Cheer Pheasants (*Phasianus wallichii*), ♂ ♀. Received in exchange.
- 1 Common Nuthatch (*Sitta cæsia*). Purchased.

- Feb. 27. 1 Sambur Deer (*Cervus aristotelis*), ♂. Born in the Menagerie.
- Mar. 1. 1 Common Hare (*Lepus europæus*). Presented by Mrs. F. Buckland.
3. 1 Syrian Bear (*Ursus syriacus*). Presented by Dr. J. Huntley, C.M.Z.S., Bushire, Persian Gulf.
4. 1 Green Monkey (*Cercopithecus callitrichus*). Presented by Miss E. A. B. Payton.
6. 3 Japanese Deer (*Cervus sika*), ♂, ♀, ♀. Presented by the Viscount Powerscourt, F.Z.S.
- 2 Lanceolated Jays (*Garrulus lanceolatus*). Purchased.
- 2 Chilian Skunks (*Conepatus mapurito*). Deposited.
7. 1 Pig-tailed Monkey (*Macacus nemestrinus*), ♀. Presented by Mrs. J. E. Fenton.
- 1 Coati (*Nasua rufa*). Purchased.
- 2 Acouchys (*Dasypsecta acouchy*). Purchased.
8. 2 Mountain-Finches (*Fringilla montifringilla*). Purchased.
10. 1 Indian Fruit-Bat (*Pteropus medius*). Presented by Capt. F. P. Millett.
- 3 Common Badgers (*Meles taxus*). Born in the Menagerie.
11. 1 Brant Goose (*Bernicla brenta*). Presented by H. A. Dombrain, Esq.
12. 1 Mitred Monkey (*Sennopithecus mitratus*). Received in exchange.
- 1 Black-faced Spider Monkey (*Ateles ater*). Received in exchange.
- 1 Black-handed Spider Monkey (*Ateles geoffroyi*). Received in exchange.
- 1 Mule Deer (*Cervus macrotis*), ♂. Presented by Judge Caton. See P. Z. S. 1879, p. 308.
14. 2 Gaimard's Rat Kangaroos (*Hypsiprymnus gaimardi*), ♂, ♀. Presented by Ernest E. Harrold, Esq.
16. 1 Spotted Ichneumon (*Herpestes auropunctatus*). Presented by Miss H. Boteler.
- 1 Black-necked Stilt Plover (*Himantopus nigricollis*). Purchased.
17. 1 Tabuan Parrakeet (*Pyrrhuloxia tabuensis*). Deposited.
- 1 Stair's Dove (*Phlogoenas stairi*). Purchased.
18. 1 Bonnet-Monkey (*Macacus radiatus*), ♂. Presented by George Eggar, Esq.
- 1 Chinchilla (*Chinchilla lanigera*). Presented by Sir Charles Smith.
20. 1 Sumatran Rhinoceros (*Rhinoceros sumatrensis*). Deposited. See P. Z. S. 1879, p. 308.
- 1 Greater Spotted Woodpecker (*Picus major*). Presented by H. Laver, Esq.
22. 1 Mona Monkey (*Cercopithecus mona*), ♀. Presented by Miss Sandford.
- 1 Pied Wagtail (*Motacilla yarrelli*). Purchased.
- 1 Reed-Bunting (*Emberiza schæmclus*). Purchased.
25. 1 Cape Ant-Bear (*Orycteropus capensis*). Purchased.
- 5 European Geckoes (*Phyllodactylus europæus*). Presented by Dr. H. E. Giglioli, C.M.Z.S.
27. 1 Grey-breasted Parrot (*Bolborhynchus monachus*). Presented by Miss Hilhouse.
28. 1 Green Monkey (*Cercopithecus callitrichus*), ♂. Presented by J. N. Tiedeman Marthege, Esq.

- Mar. 28. 1 Globose Curassow (*Crax globicera*), ♀. Presented by the Rev. Ralph Cooper.  
 1 Common Peafowl (*Pavo cristatus*), ♂. Presented by T. B. Hopkinson, Esq.
29. 1 Pebas Armadillo (*Tatusia peba*). Purchased.  
 1 Long-haired Armadillo (*Dasypus vellerosus*). Purchased.  
 1 Brazilian Hare (*Lepus brasiliensis*). Purchased.
30. 1 Laughing Kingfisher (*Dacelo gigantea*). Presented by F. Belcher, Esq.
31. 1 Reed-Bunting (*Emberiza schachnichus*). Purchased.  
 8 Indian Jerboa Rats (*Gerbillus indicus*). Purchased.  
 2 New-Zealand Parakeets (*Cyanorhampus novæ zealandiæ*). Purchased.
- April 1. 1 Black-backed Jackal (*Canis mesomelas*). Presented by E. J. Redman, Esq.  
 1 Red-and-yellow Macaw (*Ara chloroptera*). Presented by Mrs. Kelly.  
 2 Yellow-fronted Amazons (*Chrysotis ochrocephala*). Presented by Mrs. Kelly.  
 2 Silver Pheasants (*Euplocamus nyctemerus*), ♂, ♀. Presented by W. Soper, Esq.  
 2 Lanceolated Jays (*Garrulus lanceolatus*). Received in exchange. See P. Z. S. 1879, p. 384.
2. 1 Tuberculated Lizard (*Iguana tuberculata*). Presented by Dr. J. F. Chittenden, C.M.Z.S. From Trinidad.  
 1 Broad-snouted Cayman (*Alligator latirostris*). Presented by Dr. A. Stradling.  
 2 Common Boas (*Boa constrictor*). Deposited.  
 1 Chequered Elaps (*Elaps lemniscatus*). Deposited.  
 1 Anaconda (*Eunectes murinus*). Received in exchange.
3. 2 White-rumped Roe Deer (*Capreolus pygargus*). Received in exchange. See P. Z. S. 1879, p. 384.  
 1 Chinese Water-Deer (*Hydropotes inermis*). Received in exchange.  
 1 Greater Sulphur-crested Cockatoo (*Cacatua galerita*). Deposited.  
 2 Mississippi Alligators (*Alligator mississippiensis*). Presented by Lord Francis Conyngham, M.P., F.Z.S.
4. 4 Canada Geese (*Bernicla canadensis*). Presented by R. J. Balston, Esq., F.Z.S.  
 2 Barnacle Geese (*Bernicla leucopsis*). Presented by R. J. Balston, Esq., F.Z.S.  
 2 Brant Geese (*Bernicla brenta*). Presented by R. J. Balston, Esq., F.Z.S.  
 1 Wild Goose (*Anser ferus*). Presented by R. J. Balston, Esq., F.Z.S.  
 1 Bean-Goose (*Anser segetum*). Presented by R. J. Balston, Esq., F.Z.S.  
 2 Common Geese (*Anser domesticus*), ♂, ♀. Presented by R. J. Balston, Esq., F.Z.S.  
 3 Common Ducks (*Anas boschas*), 2 ♂ and 1 ♀. Presented by R. J. Balston, Esq., F.Z.S.  
 3 Australian Wild Ducks (*Anas superciliosa*). Presented by R. J. Balston, Esq., F.Z.S.  
 2 Ruddy Sheldrakes (*Tadorna rutila*), ♂ and ♀. Presented by R. J. Balston, Esq., F.Z.S.

- April 4. 2 Common Pintails (*Dafila acuta*), ♂ and ♀. Presented by R. J. Balston, Esq., F. Z. S.
- 2 Gadwalls (*Anas strepera*), ♂ and ♀. Presented by R. J. Balston, Esq., F. Z. S.
- 4 Chiloe Wigeon (*Mareca chilensis*), 2 ♂ and 2 ♀. Presented by R. J. Balston, Esq., F. Z. S.
- 2 Mandarin Ducks (*Aix galericulata*), ♂ and ♀. Presented by R. J. Balston, Esq., F. Z. S.
- 1 Summer Duck (*Aix sponsa*), ♂. Presented by R. J. Balston, Esq., F. Z. S.
- 2 Common Teal (*Querquedula crecca*), ♂ and ♀. Presented by R. J. Balston, Esq., F. Z. S.
- 2 Garganey Teal (*Querquedula circia*), ♂ and ♀. Presented by R. J. Balston, Esq., F. Z. S.
- 2 Chilian Pintails (*Dafila spinicauda*), ♂ and ♀. Presented by R. J. Balston, Esq., F. Z. S.
- 2 Common Wigeon (*Mareca penelope*), ♂ and ♀. Presented by R. J. Balston, Esq., F. Z. S.
5. 1 Neck-marked Snake (*Geophyas collaris*). Purchased.
6. 1 Rude Fox (*Canis rudis*). From Demerara. Deposited.
8. 1 Rhesus Monkey (*Macacus erythraeus*). Presented by Mr. J. Roberts.
- 1 Grivet Monkey (*Cercopithecus griseo-viridis*). Presented by W. B. Greenfield, Esq.
- 1 Common Seal (*Phoca vitulina*). Presented by Capt. Charles Rawle.
- 1 Red-throated Diver (*Colymbus septentrionalis*). Presented by J. S. Thompson, Esq.
10. 1 Yak (*Bison grunniens*), ♂. From Bhootan. Presented by the Hon. Sir Ashley Eden, K.C.S.I.
- 1 Long-tailed Marmot (*Arctomys caudatus*). Presented by the Hon. Sir Ashley Eden, K.C.S.I.
- 1 Masked Parakeet (*Pyrrhulopsis personata*). Purchased.
12. 1 Entellus Monkey (*Semnopithecus entellus*), ♀. Received in exchange.
- 1 Japanese Goat Antelope (*Capricornus crispus*). Presented by Harry Pryer, Esq., C.M.Z.S. See P. Z. S. 1879, p. 384.
14. 1 Blue-faced Green Amazon (*Chrysotis bouqueti*). Presented by Neville Holland, Esq.
- 1 Yellow-fronted Amazon (*Chrysotis ochrocephala*). Presented by Neville Holland, Esq.
18. 3 Red Brockets (*Cervus rufus*), ♂ and ♀ and young. Presented by W. H. Lacy, Esq.
- 1 Upland Goose (*Bernicla magellanica*), ♂. Purchased.
19. 1 Black-faced Kangaroo (*Macropus melanops*), ♂. Purchased.
- 1 Skate (*Raia batis*). Presented by Harold Russell, Esq.
20. 1 Reeves's Muntjac (*Cervulus reevesi*), ♀. Born in the Menagerie.
21. 1 Puff-Adder (*Vipera arietans*). Purchased.
23. 3 Prairie-Marmots (*Cynomys ludovicianus*). Presented by W. G. Marshall, Esq.
- 1 Lineated Boodon (*Boodon lineatus*). Purchased.
- 1 Spotted Slowworm (*Acontias meleagris*). Purchased.
- 1 Crossed Snake (*Psammophis crucifer*). Purchased.
- 1 Coppery Snake (*Rhinostoma cupreum*). Purchased.
24. 1 Black-handed Spider Monkey (*Ateles geoffroyi*), ♂. Presented by D. R. Comyn, Esq.

- Apr. 24. 1 Three-toed Amphiuma (*Amphiuma means*). Presented by A. C. Cole, Esq.  
 1 Long-eared Bat (*Plecotus auritus*). Presented by Mr. J. Ward.  
 25. 1 Podargus (*Podargus cuvieri*). Presented by R. S. C. Baber, Esq.  
 26. 1 Guilding's Amazon (*Chrysotis guildingi*). From St. Vincent, West Indies. Presented by G. Dundas, Esq.  
 28. 5 Water-Ouzels (*Cinchus aquaticus*). Presented by F. Swabey, Esq.  
 29. 1 Reeves's Muntjac (*Cervulus reevesi*), ♀. Born in the Gardens.  
 1 Silver Pheasant (*Euplocamus nyctemerus*), ♂. Presented by Mrs. E. J. Beagle.  
 30. 1 Crab-eating Raccoon (*Procyon cancrivorus*), ♀. Presented by R. Bridgett, Esq.  
 1 Small Hill-Mynah (*Gracula religiosa*). Presented by J. W. Woodler, Esq.  
 1 Alpine Accentor (*Accentor alpinus*). In exchange. See P. Z. S. 1879, p. 384.
- May 1. 1 Leopard Tortoise (*Testudo pardalis*). Purchased.  
 1 Bonnet-Monkey (*Macacus radiatus*), ♂. Presented by Mr. E. Brett.  
 1 Ocelot (*Felis pardalis*). Presented by B. H. Jones, Esq.  
 1 Anaconda (*Eunectes murinus*). Presented by G. H. Hawtayne, Esq., C.M.Z.S.  
 1 Common Teguxin (*Teius teguxin*). Purchased.  
 2. 1 Pig-tailed Monkey (*Macacus nemestrinus*), ♀. Presented by E. M. Clissold, Esq.  
 1 Long-tailed Marmot (*Arctomys caudatus*). Presented by Capt. Greenstreet, R. E. From Bhotan.  
 1 Undulated Grass-Parrakeet (*Melopsittacus undulatus*), ♂. Presented by Miss Balls.  
 1 Black-faced Spider Monkey (*Ateles ater*), ♂. Presented by Capt. H. King. From Carthage.  
 2 Tovi Parrakeets (*Brotogeris tovi*). Presented by Capt. H. King. From Porto Cabello.  
 2 Passerine Ground-Doves (*Chamaepelia passerina*). Presented by Capt. H. King.  
 1 South-American Flamingo (*Phaenicopterus ignipalliatu*s). Purchased.  
 1 White Ibis (*Ibis alba*). Purchased.  
 1 Scarlet Ibis (*Ibis rubra*). Purchased.  
 3 Red-billed Tree-Ducks (*Dendrocygna autumnalis*). Purchased.  
 3. 1 Tamandua Ant-eater (*Tamandua tetradactyla*). Purchased.  
 1 Great American Egret (*Ardea egretta*). Purchased.  
 1 Common Boa (*Boa constrictor*). Purchased.  
 4. 1 Madagascar Boa (*Pelophilus madagascariensis*). Presented by the Rev. Canon G. Ogilvy.  
 5. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Presented by C. A. Thomson, Esq.  
 1 Macaque Monkey (*Macacus cynomolgus*) ♀. Presented by F. V. Goddard, Esq.  
 6. 1 Common Ocelot (*Felis pardalis*). Presented by P. Leckie, Esq.  
 1 Indian Kite (*Milvus govinda*). Presented by Capt. Murray.

- May 6. 1 Common Chameleon (*Chamaleon vulgaris*). Presented by G. A. Dodd, Esq.
- 12 Common Teal (*Querquedula crecca*), 6 ♂ and 6 ♀. Purchased.
- 12 Garganey Teal (*Querquedula circia*), 6 ♂ and 6 ♀. Purchased.
- 12 Red-headed Pochards (*Fuligula ferina*), 6 ♂ and 6 ♀. Purchased.
- 6 Tufted Ducks (*Fuligula cristata*), 3 ♂ and 3 ♀. Purchased.
- 4 Shovellers (*Spatula clypeata*), 2 ♂ and 2 ♀. Purchased.
- 2 Common Pintails (*Dafila acuta*), ♂ and ♀. Purchased.
- 2 Common Wigeon (*Mareca penelope*), ♂ and ♀. Purchased.
8. 2 Horned Parrakeets (*Nymphicus cornutus*). Purchased. From New Caledonia. See P. Z. S. 1879, p. 550, pl. xlv.
- 1 Diana Monkey (*Cercopithecus diana*), ♀. Received in exchange.
- 1 Subcylindrical Hornbill (*Buceros subcylindricus*). Received in exchange. See P. Z. S. 1879, p. 550.
9. 6 Seven-banded Snakes (*Tropidonotus leberis*). Born in the Menagerie.
10. 1 Macaque Monkey (*Macacus cynomolgus*). Deposited.
- 1 Pig-tailed Monkey (*Macacus nemestrinus*), ♀. Presented by Capt. A. W. Shean.
- 1 Hybrid Markhoor (*Capra megaceros*), ♂. Born in the Menagerie.
- 5 Peacock Pheasants (*Polyplectron chinquis*), 3 ♂ and 2 ♀. Purchased.
- A collection of Young Common Eels (*Anguilla vulgaris*). Presented by F. Buckland, Esq., F.Z.S.
- 1 Herring-Gull (*Larus argentatus*). Presented by Miss J. Windsor.
12. 1 Rhesus Monkey (*Macacus erythræus*). Presented by H. Winsor, Esq.
13. 2 Geoffroy's Doves (*Peristera geoffroyi*). Bred in the Gardens.
14. 1 Puma (*Felis concolor*), ♂. Purchased.
- 1 Vulpine Phalanger (*Phalangista vulpina*), ♀. Presented by A. Elder, Esq.
- 1 Ring-necked Parrakeet (*Palæornis torquatus*). Presented by F. S. Prince, Esq.
- 1 Guianan Tree-Partridge (*Odontophorus guianensis*). Presented by E. L. Marshall, Esq.
15. 1 Herring-Gull (*Larus argentatus*). Presented by C. H. C. de Loecker, Esq.
16. 1 Zebu (*Bos indicus*), ♂. Born in the Menagerie.
- 1 Rough Terrapin (*Clemmys punctularia*). Presented by Surgeon-Major C. J. Weir.
- 1 Adorned Terrapin (*Clemmys ornata*). Presented by Surgeon-Major C. J. Weir.
- 1 Stair's Ground-Dove (*Phlogoenas stairii*). Purchased.
17. 2 Squirrel Monkeys (*Chrysotrux sciurea*), ♂. Purchased.
- 2 Plantain-Squirrels (*Sciurus plantani*), ♂ and ♀. Purchased.
- 1 Ariel Toucan (*Ramphastos ariel*). Purchased.
- 1 Blue Jay (*Cyanocitta cristata*). Purchased.
- 1 Sclater's Curassow (*Crax sclateri*). Purchased.
- 1 Yellow-legged Herring-Gull (*Larus leucophæus*). Bred in the Gardens.
19. 2 Bactrian Camels (*Camelus bactrianus*), ♀. Deposited.
- 1 Javan Fish-Owl (*Ketupa javanensis*). Purchased.

- May 19. 2 Black-tailed Godwits (*Limosa melanura*). Purchased.  
 2 Black Swans (*Cygnus atratus*), ♂ and ♀. Received in exchange.  
 5 Prussian Carp (*Carassius vulgaris*). Presented by G. H. Jones, Esq., F.Z.S.
20. 1 Grey-cheeked Monkey (*Cercocebus albigena*), ♀. Presented by Robt. Surry, Esq.  
 1 Patagonian Sea-lion (*Otaria jubata*). Presented by F. E. Cobb, Esq. From the Falkland Islands. See P. Z. S. 1879, p. 551.  
 1 Ceram Lory (*Lorius garrulus*). Purchased.
21. 2 Chinchillas (*Chinchilla lanigera*). Born in the Menagerie.  
 1 Common Lobster (*Astacus vulgaris*). Presented by Mr. J. Ward.
22. 3 Abyssinian Guinea-fowls (*Nunida pitlorhyncha*). Purchased.  
 1 Nicobar Pigeon (*Calenas nicobarica*). Purchased.  
 2 Golden headed Conures (*Conurus auricapillas*). Purchased.  
 2 Javan Parakeets (*Palaeornis javanicus*). Purchased.
23. 1 Roseate Cockatoo (*Cacatua roseicapilla*). Presented by Mr. Head.  
 1 Blue-Winged Green Bulbul (*Phyllornis hardwickii*). Presented by Mr. A. Jamrach.  
 1 Black-necked Swan (*Cygnus nigricollis*). Bred in the Gardens.  
 2 Horned Lizards (*Phrynosoma cornutum*). Presented by E. Loder, Esq., F.Z.S.
24. 1 Red-faced Saki (*Brachypurus rubicundus*). Purchased. See P. Z. S. 1879, p. 551.  
 2 Green-necked Peafowls (*Pavo spicifer*). Purchased.  
 1 Cheetah (*Felis jubata*). Purchased.  
 12 Common Wigeon (*Mareca penelope*), 6 ♂ and 6 ♀. Purchased.
25. 1 Victoria Crowned Pigeon (*Goura victoria*). Purchased.  
 1 Mace's Sea-Eagle (*Haliaeetus leucoryphus*). Purchased.  
 4 Common Sheldrakes (*Tadorna vulpanser*), 2 ♂ and 2 ♀. Purchased.
26. 1 Geoffroy's Dove (*Peristera geoffroyi*). Bred in the Gardens.  
 1 Argus Pheasant (*Argus giganteus*), ♂. Purchased.  
 1 Puff-Adder (*Vipera arietans*). Presented by Surgeon F. Speer.  
 2 Silky Marmosets (*Midas rosalia*). Presented by Mrs. Hector.
27. 1 Michie's Tufted Deer (*Elaphodus michianus*). Deposited.  
 1 White-thighed Colobus (*Colobus bicolor*). Presented by Dr. W. H. Hart.
30. 1 Brown Hyæna (*Hyæna brunnea*). Purchased.  
 1 Axis Deer (*Cervus axis*) ♂. Born in the Menagerie.
31. 1 Capybara (*Hydrochaerus capybara*). Presented by H. B. Whitmarsh, Esq.
- June 2. 1 Great Kangaroo (*Macropus giganteus*), ♂. Born in the Menagerie.  
 1 Red Kangaroo (*Macropus rufus*), ♂. Born in the Menagerie.  
 1 Bennett's Wallaby (*Halmaturus bennettii*), ♀. Born in the Menagerie.  
 3. 1 Rhesus Monkey (*Macacus erythræus*). Presented by J. Beech, Esq.  
 1 Eland (*Oreos canna*), ♂. Born in the Menagerie.
4. 1 Golden Eagle (*Aquila chrysaetos*). Presented by The Earl of Dunmore, F.Z.S.  
 3 Crossbred Parakeets (between *Euphema elegans* ♂ and *E. pulchella*, ♀). Bred in the Gardens.

- June 4. 3 Egyptian Geese (*Chenalopex aegyptiaca*). Bred in the Gardens.  
 5. 3 Green-necked Peafowls (*Pavo spicifer*). Deposited by Col. C. P. Hildebrand.  
 2 Common Kingfishers (*Alcedo ispida*). Presented by W. W. Cobb, Esq.  
 1 Red-and-yellow Macaw (*Ara chloroptera*). Presented by Miss C. Cattlin.  
 3 Maned Geese (*Bernicla jubata*), 1 ♂ and 2 ♀. Purchased.  
 4 Amherst Pheasants (*Thaumalea amherstiae*). Bred in the Gardens.  
 7. 1 Common Seal (*Phoca vitulina*). Purchased.  
 8. 1 Canadian Beaver (*Castor canadensis*). Born in the Menagerie.  
 9. 2 Yellow-legged Herring-Gulls (*Larus leucophæus*). Bred in the Gardens.  
 2 Orinoco Geese (*Chenalopex jubata*). Purchased.  
 1 Green-winged Trumpeter (*Psophia viridis*). Purchased.  
 2 Black Hornbills (*Buceros atratus*). Purchased.  
 1 Back-marked Snake (*Rhinechis scalaris*). Purchased.  
 1 Common Crowned Pigeon (*Goura coronata*). Purchased.  
 3 White-bellied Shore-Larks (*Eremophila chrysolaema*). Purchased.  
 6 Melodious Finches (*Phonipara canora*). Purchased.  
 10. 1 White-whiskered Paradoxure (*Paradoxurus leucomystax*). Presented by Mr. Carl Bock.  
 2 Undulated Grass-Parakeets (*Melopsittacus undulatus*). Purchased.  
 5 Climbing Fishes (*Anabas scandens*). Presented by Dr. G. E. Dobson, C.M.Z.S.  
 11. 1 Rhesus Monkey (*Macacus erythræus*), ♀. Deposited.  
 2 Common Paradoxures (*Paradoxurus typus*). Presented by G. K. Loyd, Esq.  
 2 Geoffroy's Doves (*Peristera geoffroyi*). Bred in the Gardens.  
 1 Common Magpie (*Pica caudata*). Presented by J. L. Baldwin, Esq., F.Z.S.  
 12. 1 Black Bear (*Ursus americanus*). Received in exchange.  
 1 Globose Curassow (*Crao globicera*). Purchased.  
 1 Red-and-yellow Macaw (*Ara chloroptera*). Purchased.  
 13. 1 Indian Antelope (*Antilope cervicapra*), ♂. Presented by Hon. A. Greville.  
 1 Laughing Kingfisher (*Dacelo gigantea*). Presented by Mr. E. Hawkins.  
 1 West-African Python (*Python sebae*). Presented by G. H. Garrett, Esq.  
 14. 1 Tamandua Ant-eater (*Tamandua tetradactyla*). Purchased. From Pernambuco.  
 1 Brazilian Cariama (*Cariama cristata*). Purchased.  
 1 Crested Screamer (*Chauna chavaria*). Purchased.  
 1 Great American Egret (*Ardea egretta*). Purchased.  
 1 Tuberculated Lizard (*Iguana tuberculata*). Presented by Dr. A. Stradling.  
 1 Taraguira Lizard (*Taraguira smithi*). Presented by Dr. A. Stradling. From Bahia.  
 1 Black-eared Marmoset (*Hapale penicillata*). Purchased.  
 1 Negro Tamarin (*Midas ursulus*). Purchased. From Para.  
 1 Sun-Bittern (*Eurypyga helias*). Purchased.  
 1 Spotted-billed Toucanet (*Selenidera maculirostris*). Purchased. From Rio de Janeiro. See P. Z. S. 1879, p. 663.



- June 14. 3 Violet Tanagers (*Euphonia violacea*). Purchased.  
 2 Saffron Finches (*Sycalis flaveola*). Purchased. From Pernambuco.  
 1 Pileated Song-Sparrow (*Zonotrichia pileata*). Purchased. From Pernambuco.  
 1 Pileated Finch (*Coryphospingus pileatus*). Purchased. From Pernambuco.  
 2 Bluish Finches (*Spermophila caerulescens*). Purchased. From Pernambuco.
15. 2 Chiloe Wigeons (*Mareca chiloensis*). Bred in the Gardens.  
 1 Caspian Ouaran (*Psammosaurus caspicus*). Presented by Commander J. Pratt. From Persia.  
 1 Lacertine Snake (*Cælopettis lacertina*). Presented by Commander J. Pratt.
16. 1 Common Badger (*Meles taxus*). Presented by Mr. G. Smith.  
 20 Spotted Salamanders (*Salamandra maculosa*). Purchased.
17. 2 Egyptian Gazelles (*Gazella dorcas*). Presented by Commander J. Pratt.  
 1 Ring-necked Parrakeet (*Palæornis torquatus*). Presented by E. F. Carey, Esq.  
 1 Beech-Marten (*Martes foina*). Purchased. From Russia.  
 1 Allied Goshawk (*Astur approximans*). Purchased.  
 1 Martinique Water-hen (*Porphyrio martinicus*). Purchased.  
 4 Australian Wild Ducks (*Anas superciliosa*). Presented by Messrs. A. H. Jamrach and C. Rice.
18. 1 Greater Sulphur-crested Cockatoo (*Cacatua galerita*). Presented by J. W. Taylor, Esq.  
 1 American Robin (*Turdus migratorius*). Deposited.  
 2 Pied Wagtails (*Motacilla yarrellii*), ♂ and ♀. Presented by A. F. Wiener, Esq., F.Z.S.  
 1 Wiener's Finch (*Pytelia wieneri*). Presented by A. F. Wiener, Esq., F.Z.S.  
 11 Spotted Salamanders (*Salamandra maculosa*). Purchased.
19. 1 Brazilian Tanager (*Ramphocelus brasilius*). Purchased.  
 1 Slender-billed Cockatoo (*Licmetis tenuirostris*). Presented by George Wood, Esq.  
 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Presented by Mr. G. T. Close. From Chittagong.  
 1 Hybrid Deer (between *Cervus mexicanus* ♂ and *C. virginianus* ♀), ♂. Born in the Menagerie.  
 1 Persian Gazelle (*Gazella subgutturosa*), ♂. Presented by C. H. Watts, Esq.  
 2 Egyptian Kites (*Milvus ægyptius*). Presented by A. Bells, Esq.  
 3 Green-backed Porphyrios (*Porphyrio madagascariensis*). Presented by A. Bells, Esq.  
 1 Ceram Lory (*Lorius garrulus*). Deposited.  
 2 Jameson's Gulls (*Larus jamesoni*). Bred in the Gardens.
20. 1 Macaque Monkey (*Macacus cynomolgus*). Presented by Miss E. Cattlin.  
 1 Kinkajou (*Cercoleptes caudivolvulus*), ♀. Presented by M. B. Salmon, Esq. From Demerara.  
 2 African Civet Cats (*Viverra civetta*). Presented by M. B. Salmon, Esq.  
 A Collection of Salmon Fry (*Salmo salar*). Presented by T. J. Mann, Esq.

- June 21. 1 Garnett's Galago (*Galago garnetti*), ♂. Presented by F. W. Barff, Esq.  
 1 Collared Fruit-Bat (*Cynonycteris collaris*). Born in the Menagerie.  
 1 West African-Python (*Python sebae*), Deposited.  
 23. 3 Black Rats (*Mus rattus*). Born in the Menagerie.  
 1 Crested Pigeon (*Ocyphaps lophotes*). Presented by Rev. A. H. Glennie.  
 3 Spotted-billed Ducks (*Anas pæcilorhyncha*). Bred in the Gardens.  
 3 Australian Wild Ducks (*Anas superciliosa*). Bred in the Gardens.  
 2 Chilian Pintails (*Dafila spinicauda*). Bred in the Gardens.  
 2 Lesser Redpoles (*Linota rufescens*), ♂ and ♀. Presented by Dr. Bree, F.Z.S.  
 24. 2 Black-tailed Godwits (*Limosa melanura*). Purchased.  
 2 Tuatera Lizards (*Sphenodon punctatus*). Purchased. See P. Z. S. 1879, p. 663.  
 2 Beautiful Parrakeets (*Psephotus pulcherrimus*). Purchased.  
 27. 2 Geoffroy's Doves (*Peristera geoffroyi*). Bred in the Gardens.  
 4 White Storks (*Ciconia alba*). Purchased.  
 30. 1 Black-faced Spider Monkey (*Ateles ater*). Purchased.  
 3 Red-billed Tree-Ducks (*Dendrocygna autumnalis*). Purchased.  
 1 Grand Galago (*Galago crassicaudata*). Presented by Mr. W. Jenkins.  
 1 Puma (*Felis concolor*), ♂. Presented by Lord Lilford, F.Z.S. From Buenos Ayres.  
 1 Reticulated Python (*Python reticulatus*). Purchased.
- July 1. 1 Grivet Monkey (*Cercopithecus griseo-viridis*), ♂. Presented by R. M. Courage, Esq.  
 1 Common Boa (*Boa constrictor*). Presented by Dr. A. Stradling.  
 2 White Storks (*Ciconia alba*). Purchased.  
 1 Axis Deer (*Cervus axis*), ♀. Born in the Menagerie.  
 2. 4 Land-Crabs. Received in exchange.  
 1 Common Whimbrel (*Numenius phæopus*). Received in exchange.  
 4. 1 Rhesus Monkey (*Macacus erythræus*), ♀. Presented by James Bartle, Esq.  
 1 Blue-eyed Cockatoo (*Cacatua ophthalmica*). Presented by Lieut.-Col. Arbuthnot, 14th Hussars.  
 1 Collared Fruit-Bat (*Cynonycteris collaris*). Purchased. Captured in the Red Sea.  
 7. 1 Japanese Deer (*Cervus sika*), ♂. Born in the Menagerie.  
 1 Indian Python (*Python molurus*). Presented by Mr. George Billett.  
 1 South-American Rat-Snake (*Spilotes variabilis*). Presented by Mr. George Billett.  
 8. 1 Yellow-footed Rock-Kangaroo (*Petrogale xanthopus*), ♂. Purchased.  
 2 Balearic Crowned Cranes (*Balcarica pavonina*). Purchased.  
 2 Siamese Pheasants (*Euplocamus praelatus*), ♂ ♀. Purchased.  
 1 Darwin's Pucras Pheasant (*Pucrasia darwini*), ♂. Purchased.  
 4 Rose-ringed Parrakeets (*Palæornis docilis*). Purchased.  
 1 Black-winged Peafowl (*Pavo nigripennis*), ♀. Presented by The Hon. A. S. G. Canning.

- July 8. 2 Common Barn-Owls (*Strix flammea*). Presented by R. A. Baldwin, Esq.
9. 2 Crested Porcupines (*Hystrix cristata*). Presented by Moses S. Boyle, Esq.
11. 3 Australian Wild Ducks (*Anas superciliosa*). Bred in the Gardens.
- 1 Yellow-billed Duck (*Anas xanthorhyncha*). Bred in the Gardens.
- 6 Rosy-billed Ducks (*Metopiana peposaca*). Bred in the Gardens.
12. 1 Striped Hyæna (*Hyæna striata*). Purchased.
- 4 Black Swans (*Cygnus atratus*). Purchased.
- 2 Elliot's Guinea-fowls (*Numida ellioti*). Deposited.
- 4 Vulturine Guinea-fowls (*Numida vulturina*). Deposited.
- 1 Buff-backed Egret (*Ardea russata*). Presented by Capt. Burke, S.S. 'Arcot.'
- 6 Small-scaled Mastigures (*Uromastix microlepis*). Presented by Capt. Burke, S.S. 'Arcot.' From the Persian Gulf.
- 1 Hey's Partridge (*Ammoperdix heyi*). Presented by Capt. Burke, S.S. 'Arcot.' From the Persian Gulf.
- 1 Gold Pheasant (*Thaumalea picta*), ♂. Presented by J. E. Liardet, Esq.
14. 3 Globose Curassows (*Craz globicera*), 1 ♂ and 2 ♀. Presented by Major F. Hime.
- 1 European Bearded Vulture (*Gypætus barbatus*). Presented by Lord Lilford, F.Z.S.
- 1 American Kestrel (*Tinnunculus sparverius*). Purchased. From San Domingo.
15. 1 Lesser White-nosed Monkey (*Cercopithecus petaurista*), ♂. Presented by Robert F. Clothier, Esq.
- 2 Ring-tailed Lemurs (*Lemur catta*), ♂ and ♀. Presented by Hugh McCubbin, Esq.
- 1 Common Ocelot (*Felis pardalis*), ♂. Purchased.
16. 1 Funereal Cockatoo (*Calyptorhynchus funereus*). Purchased. See P. Z. S. 1879, p. 663.
- 1 Smooth Snake (*Coronella levis*). Purchased.
17. 1 White-tailed Gnu (*Catoblepas gnu*), ♂. Purchased.
- 2 Yellow-bellied Parrakeets (*Platyercus flaviventris*). Purchased.
- 4 Common Crowned Pigeons (*Goura coronata*). Purchased.
18. 1 Mule Deer (*Cervus macrotis*), ♂. Presented by Herbert H. Carter, Esq. From Wyoming Territory, U. S. A. See P. Z. S. 1879, p. 664.
- 1 Mule Deer (*Cervus macrotis*), ♀. Presented by E. N. Carter, Esq. See P. Z. S. 1879, p. 664.
- 1 Lesser Sulphur-crested Cockatoo (*Cacatua sulphurea*). Presented by Miss Langley.
- 1 Red-and-yellow Macaw (*Ara chloroptera*). Deposited.
22. 1 Geoffroy's Marmoset (*Midas geoffroyi*), ♂. Purchased. From Panama.
- 2 Golden Eagles (*Aquila chrysaetos*). Presented by Mrs. A. H. Browne.
- 1 Stanley Crane (*Tetrapteryx paradisea*). Received in exchange.
23. 1 Peacock Pheasant (*Polyplectron chinquis*). Bred in the Gardens.
- 2 Black-crested Cardinals (*Gubernatrix cristatella*). Bred in the Gardens.

- July 23. 2 Red-and-yellow Macaws (*Ara chloroptera*) Presented by Charles Fricker, Esq.  
 1 Red-and-blue Macaw (*Ara macao*). Presented by Charles Fricker, Esq.  
 1 Blue-and-yellow Macaw (*Ara ararauna*). Presented by Charles Fricker, Esq.
24. 1 Common Trumpeter (*Psophia crepitans*). Presented by Charles Fricker, Esq.  
 1 Coquetoan Antelope (*Cephalophus rufilatus*). Purchased.  
 2 Geoffroy's Doves (*Peristera geoffroyi*). Bred in the Gardens.
26. 3 Grey Mulletts (*Mugil capito*). Presented by G. H. Jones, Esq. F. Z. S.  
 1 Common Sole (*Solea vulgaris*). Presented by G. H. Jones, Esq., F. Z. S.
28. 1 Weeper Capuchin (*Cebus capucinus*), ♂. Presented by Capt. R. Bond.
29. 2 White-faced Tree-Ducks (*Dendrocygna viduata*). Purchased.  
 1 Red-bill Tree-Duck (*Dendrocygna autumnalis*). Purchased.  
 1 Central American Agouti (*Dasyprocta isthmica*). Purchased.
31. 2 Common Crossbills (*Loxia curvirostra*), ♂ and ♀. Presented by H. A. Macpherson, Esq.  
 1 Allen's Porphyrio (*Porphyrio alleni*). Captured at sea off Sierra Leone, 5° N., 14° W. Presented by W. B. Brown, Esq.
- Aug. 1. 1 Bateleur Eagle (*Helotarsus ecaudatus*). From Sierra Leone. Presented by Alex. Sinclair, Esq.  
 1 Common Cuckoo (*Cuculus canorus*). Presented by Miss C. Bealey.
2. 1 Spanish Imperial Eagle (*Aquila adalberti*). Presented by the Marquis de la Granja, F. Z. S.  
 1 Brown Bear (*Ursus arctos*). Presented by J. R. Boyce, Esq.
4. 1 Lanner Falcon (*Falco tinnuncius*). Deposited.  
 1 Red-fronted Lemur (*Lemur rufifrons*), ♂. Received in exchange.  
 4 Specious Pigeons (*Columba speciosa*). Received in exchange.  
 1 Banded Tinamou (*Crypturus noctivagus*). Received in exchange.  
 1 Black Hornbill (*Buceros atratus*). Received in exchange.  
 1 Tamandua Ant-eater (*Tamandua tetradactyla*). Received in exchange.
5. 1 Rude Fox (*Canis rudis*). Presented by G. H. Hawtayne, Esq., C.M.Z.S. See Ann. N. H. ser. 5, vol. iv. p. 316, et p. 400.  
 1 Cobella Snake (*Liophis cobella*). Presented by G. H. Hawtayne, Esq., C.M.Z.S.  
 1 Coral Snake (*Tortrix scytale*). Presented by G. H. Hawtayne, Esq., C.M.Z.S.
- 3 North-American Turkeys (*Meleagris gallopavo*), 1 ♂ and 2 ♀. Presented by R. Wynne Roberts, Esq.
- 3 Common Kestrels (*Tinnunculus alaudarius*). Presented by the Rev. J. E. Campbell Colquhoun.
6. 1 Hybrid Deer (between *Cervus elaphus* and *C. barbarus*), ♂. Born in the Menagerie.  
 1 White-whiskered Swine (*Sus leucomystax*), ♂. Presented by Theodore Hance, Esq., C.M.Z.S.  
 2 Vociferous Sea-Eagles (*Haliaeetus vocifer*). Presented by Dr. J. Kirk, C.M.Z.S.

- Aug. 6. 1 Vulturine Guinea-fowl (*Numida vulturina*). Deposited.  
 4 Elliot's Guinea-fowls (*Numida ellioti*). Deposited.  
 3 Mitred Guinea-fowls (*Numida mitrata*). Deposited.  
 1 Wood-Owl (*Syrnium aluco*). Presented by Capt. F. Lloyd.
7. 1 Pileated Jay (*Cyanocorax pileatus*). Purchased.  
 1 Vulturine Guinea-fowl (*Numida vulturina*). Deposited.  
 1 Amherst's Pheasant (*Thaumalea amherstiae*). Bred in the Gardens.  
 3 Fork-tail Jungle-fowls (*Gallus furcatus*). Bred in the Gardens.  
 1 Australian Wild Duck (*Anas superciliosa*). Bred in the Gardens.  
 3 Chilian Pintails (*Dafila spinicauda*). Bred in the Gardens.  
 7 Brazilian Teal (*Querquedula brasiliensis*). Bred in the Gardens.
8. 1 Grey Flying Squirrel (*Sciuropterus fimbriatus*), ♀. Presented by Mrs. Louisa Edwards.  
 1 Black-faced Ibis (*Theristicus caudatus*). Presented by C. H. Whaley, Esq.  
 2 Black Storks (*Ciconia nigra*). Purchased.
13. 1 Black Stork (*Ciconia nigra*). Presented by Prof. J. Reinhardt, F.M.Z.S.
14. 2 Diana Monkeys (*Cercopithecus diana*), ♀. Presented by F. J. Crocker, Esq.  
 2 Crested Pigeons (*Ocyphaps lophotes*). Bred in the Gardens.  
 2 Geoffroy's Doves (*Peristera geoffroyi*). Bred in the Gardens.  
 2 Black-footed Penguins (*Spheniscus demersus*). Purchased.  
 1 Golden Tench (*Tinca vulgaris*, var). Presented by the Lord Walsingham, F.Z.S.
15. 1 Malbrouck Monkey (*Cercopithecus cynosurus*), ♀. Presented by Miss Agnes Barker.  
 1 Green Monkey (*Cercopithecus callitrichus*). Presented by C. F. S. Day, Esq.  
 1 Rose-crested Cockatoo (*Cacatua moluccensis*). Presented by Miss Foster.
16. 1 Common Buzzard (*Buteo vulgaris*). Deposited.  
 13 Golden Tench (*Tinca vulgaris*, var). Presented by the Lord Walsingham, F.Z.S.
18. 1 Chacma Baboon (*Cynocephalus porcaricus*). Deposited.  
 1 Common Cuckoo (*Cuculus canorus*). Presented by Mr. J. Shapland.
19. 1 Guinea Baboon (*Cynocephalus sphinx*) ♂. Presented by P. Lembery, Esq.
20. 1 Bush-Dog (*Icticyon venaticus*). From British Guiana. Presented by J. Ernest Tinné, Esq. See P. Z. S. 1879, p. 664.  
 1 Common Barn-Owl (*Strix flammea*). Presented by Mr. H. Norris.
21. 1 Cape-Buffalo (*Bubalus caffer*). Born in the Menagerie.  
 1 Smooth Snake (*Coronella levis*). Presented by — Dart, Esq.
22. 1 Ring-necked Parrakeet (*Palaeornis torquatus*). Presented by Mrs. Watson.  
 4 Common Spoonbills (*Platalea leucorodia*). Purchased.  
 18 Chesnut-breasted Ducks (*Anas castanea*). Purchased.
23. 1 Adelaide Broadtail (*Platycercus adalaidæ*). Purchased.
25. 1 Vervet Monkey (*Cercopithecus lalandi*), ♂. Presented by W. T. Millar, Esq.  
 1 Sky-Lark (*Alauda arvensis*). Presented by F. Buckland, Esq. F.Z.S.

- Aug. 26. 1 Squirrel-like Phalanger (*Belideus sciureus*). Born in the Menagerie.  
 1 Common Kestrel (*Tinnunculus alaudarius*). Presented by Mr. R. Moon.  
 1 Annulated Snake (*Leptodira annulata*). Presented by R. T. Davis, Esq.
27. 2 Electric Silurus (*Malapterurus beninensis*). Purchased.  
 1 Radiated Tortoise (*Testudo radiata*). Purchased.  
 1 Sulphur-breasted Toucan (*Ramphastos carinatus*). Purchased.  
 2 Slow Loris (*Nycticebus tardigradus*). Purchased.  
 1 Indian Otter (*Lutra nair*). Purchased. See P. Z. S. 1879, p. 664.  
 3 Black-necked Stilts (*Himantopus nigricollis*). Purchased.  
 2 Cayenne Lapwings (*Vanellus cayennensis*). Purchased.
30. 1 Chequered Elaps (*Elaps lemniscatus*). Presented by Dr. A. Stradling.  
 1 Rose-Hill Broadtail (*Platycercus eximius*). Presented by Arthur Stirling, Esq.  
 1 Red-winged Parrakeet (*Aprosmictus erythropterus*). Deposited.
31. 3 Horned Lizards (*Phrynosoma cornutum*). Presented by Ernest E. Sable, Esq., F.R.G.S.
- Sept. 2. 2 Great Bustards (*Otis tarda*), ♂ and ♀. Presented by J. C. Forster, Esq.
3. 1 European Bearded Vulture (*Gypaëtus barbatus*). Deposited by Lord Lilford, F.Z.S.  
 1 Rock-Cavy (*Cerodon rupestris*). Purchased.  
 1 Crab-eating Opossum (*Didelphys cancrivora*). Purchased.  
 1 Superb Tanager (*Calliste fastuosa*). Purchased.  
 1 Black-shouldered Tanager (*Calliste melanonota*). Purchased.  
 1 Crowned Tanager (*Tachyphonus coronatus*), ♂. Purchased.  
 1 Palm-Tanager (*Tanagra palmarum*), ♀. Purchased.  
 1 Thick-billed Tanager (*Euphonia crassirostris*). Purchased.  
 1 Brazilian Blue Grosbeak (*Guiraca cyaneu*). Purchased.  
 2 Horrid Rattlesnakes (*Crotalus horridus*), juv. Purchased.  
 2 Tuberculated Iguanas (*Iguana tuberculata*). Purchased.
4. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Presented by Mrs. James Raves.  
 1 Bonnet-Monkey (*Macacus radiatus*), ♀. Presented by Mrs. James Raves.  
 1 Tiger (*Felis tigris*), ♀. Presented by His Excellency the Rt. Hon. Lord Lytton, G.C.B., G.M.S.I.  
 2 Indian Leopards (*Felis pardus*). Presented by his Excellency the Rt. Hon. Lord Lytton, G.C.B., G.M.S.I.
5. 2 Common Chameleons (*Chamaeleon vulgaris*). Presented by Alfred Ely, Esq. From Cyprus.  
 1 Semmerring's Gazelle (*Gazella semmerringi*), ♀. Purchased.  
 1 Ashy-headed Goose (*Bernicla poliiocephala*). Purchased.  
 1 Upland Goose (*Bernicla magellanica*), ♀. Purchased.  
 2 All-green Parrakeets (*Brotoperys tiriacula*). Presented by Dr. A. Stradling.  
 2 Elegant Parrakeets (*Euphema elegans*). Purchased.  
 1 Chilian Pintail (*Dafila spinicauda*). Presented by Mr. W. Petty.  
 1 Chilian Teal (*Querquedula creccoides*). Presented by Mr. W. Petty.

- Sept. 8. 1 Common Jackal (*Canis aureus*). Presented by Thomas Thursfield, Esq., M.R.C.V.S.  
 2 Martinican Doves (*Zenaida martinicana*). Presented by Capt. Henry King.  
 1 Black-faced Spider Monkey (*Ateles ater*). Presented by Capt. Henry King.  
 2 Black Tortoises (*Testudo carbonaria*). Presented by Capt. Henry King.  
 1 Vulpine Squirrel (*Sciurus vulpinus*, var. *capistrata*). Purchased.  
 1 African Brush-tailed Porcupine (*Atherura africana*). Purchased.  
 9. 2 Hybrid Pale-headed Tree-Boas (between *Epicrates angulifer*, ♂ and *Chilobothrus inornatus*, ♀). Born in the Gardens.  
 10. 1 Plantain-Squirrel (*Sciurus plantani*). Presented by Miss Lizzie Casey.  
 1 Demeraran Cock-of-the-rock (*Rupicola crocea*), ♂. Presented by R. S. Fraser, Esq.  
 1 King Parrakeet (*Aprosmictus scapulatus*), ♂. Presented by George Wood, Esq.  
 11. 1 Red-and-blue Macaw (*Ara macao*). Deposited.  
 1 Red-and-yellow Macaw (*Ara chloroptera*). Deposited.  
 12. 1 Guinea Baboon (*Cynocephalus sphinx*), ♂. Presented by F. Naylor, Esq.  
 14. 1 White-fronted Capuchin (*Cebus albifrons*). Presented by Major H. L. Gleig.  
 15. 2 Domestic Sheep (*Ovis aries*), ♂. Presented by R. B. N. Walker, Esq., C.M.Z.S.  
 1 Common Cuckoo (*Cuculus canorus*). Presented by Mrs. Bolton.  
 1 Square-spotted Snake (*Oxyrrhopus doliaatus*). Presented by H. Colgate, Esq.  
 16. 1 Turquoise Grass-Parrakeet (*Euphema pulchella*), ♀. Presented by J. Fraser, Esq.  
 1 Common Cuckoo (*Cuculus canorus*). Presented by Miss C. Bealey.  
 17. 1 Ring-tailed Coati (*Nasua rufa*), ♂. Presented by Charles S. Barnes, Esq.  
 18. 1 Chacma Baboon (*Cynocephalus porcarius*). Deposited.  
 1 Yellow Baboon (*Cynocephalus babouin*). Deposited.  
 1 Mitred Pelican (*Pelecanus mitratus*). Presented by Dr. Holub.  
 1 Caracal (*Felis caracal*). Presented by Dr. Holub.  
 1 Secretary Vulture (*Serpentarius reptilivorus*). Presented by Dr. Holub.  
 1 Sociable Vulture (*Vultur auricularis*). Deposited.  
 1 Isabelline Antelope (*Cervicapra isabellina*). Deposited.  
 2 Tawny Eagles (*Aquila naevioides*). Presented by Dr. Holub.  
 2 Cape Crowned Cranes (*Balearica regulorum*). Deposited.  
 1 Stanley Crane (*Tetrapteryx paradisea*). Deposited.  
 19. 1 Ring-tailed Coati (*Nasua rufa*). Presented by Percy Brewis, Esq., F.Z.S.  
 1 Common Fox (*Canis vulpes*). Presented by James Wheatley, Esq.  
 2 Dunlins (*Tringa cinchus*). Presented by E. A. F. Elliot, Esq.  
 1 Turnstone (*Streptilas interpres*). Presented by E. A. F. Elliot, Esq.  
 1 Ringed Plover (*Ægialitis hiaticula*). Presented by E. A. F. Elliot, Esq.

- Sept. 22. 1 Silky Marmoset (*Midas rosalia*), ♂. Deposited.  
 1 King Parakeet (*Aprosmictus scapularis*), ♀. Presented by Gen. Blake.  
 1 Brown Bear (*Ursus arctos*), ♂. Received in exchange.  
 23. 1 Malbrouck Monkey (*Cercopithecus cynosurus*), ♂. Purchased.  
 1 Red-billed Tree-Duck (*Dendrocygna autumnalis*). Purchased.  
 24. 1 White-backed Piping Crow (*Gymnorhina leucanota*). Presented by Mrs. Buchanan.  
 25. 1 Norwegian Lemming (*Myodes lemmus*). Presented by James Shuter, Esq.  
 1 Vervet Monkey (*Cercopithecus lalandii*), ♀. Presented by E. Meyerstein, Esq.  
 1 Black Rat (*Mus rattus*). Presented by R. M. Middleton, Esq. From Rangoon.  
 1 Bonelli's Eagle (*Nisactus fasciatus*). Presented by Capt. W. P. Forwood. From Mogador.  
 27. 2 Common Buntings (*Emberiza miliaria*). Presented by J. Young, Esq.  
 29. 2 Malabar Mynahs (*Sturnia malabarica*). Presented by A. F. Wiener, Esq., F.Z.S.  
 1 Chinese Mynah (*Acridotheres cristatellus*). Presented by A. F. Wiener, Esq., F.Z.S.  
 1 Waxwing (*Amphispiza garrula*). Presented by A. F. Wiener, Esq., F.Z.S.
- Oct. 1. 1 Anaconda (*Eunectes murinus*). Presented by Capt. E. Ball.  
 2. 1 Elliot's Guinea-fowl (*Numida ellioti*). Purchased. See P. Z. S. 1879, p. 713.  
 1 Vulturine Guinea-fowl (*Numida vulturina*). Purchased.  
 3 Mitred Guinea-fowls (*Numida mitrata*). Purchased.  
 3. 3 Vulturine Guinea-fowls (*Numida vulturina*). Presented by Vice-Admiral John Corbett, C.B.  
 1 Crested Guinea-fowl (*Numida cristata*). Presented by Vice-Admiral John Corbett, C.B.  
 7 European Tree-Frogs (*Hyla arborea*). Presented by the Rev. S. R. Wilkinson, F.Z.S.  
 1 Green Lizard (*Lacerta viridis*). Presented by the Rev. S. R. Wilkinson, F.Z.S.  
 3 Spotted Salamanders (*Salamandra maculosa*). Presented by the Rev. S. R. Wilkinson, F.Z.S.  
 4. 1 Vervet Monkey (*Cercopithecus lalandii*), ♂. Presented by Sir Arthur Scott, Bart.  
 1 White-cheeked Capuchin (*Cebus lunatus*), ♂. Presented by Adrian Hope, Esq., F.Z.S.  
 1 Red Fox (*Canis fulvus*). Presented by Lord Hobart. From Labrador.  
 1 Rough-legged Buzzard (*Archibuteo lagopus*). Presented by Lord Hobart.  
 5. 5 Fat Dormice (*Myoxus glis*). Presented by Edwin Liot, Esq. From Serrach, near Esslingen, Württemberg.  
 1 Booted Eagle (*Nisactus pennatus*). Purchased.  
 6. 5 Peregrine Falcons (*Falco peregrinus*). Presented by Sir Mathew W. Ridley, Bart., M.P.  
 4 European Tree-Frogs (*Hyla arborea*). Presented by H. A. Macpherson, Esq.  
 1 Fire-bellied Toad (*Bombinator igneus*). Presented by H. A. Macpherson, Esq.



- Oct. 6. 1 Natterjack Toad (*Bufo calamita*). Presented by H. A. Macpherson, Esq.  
 2 Rendall's Guinea-fowls (*Numida rendalli*). Purchased.
7. 1 Chacma Baboon (*Cynocephalus porcanus*), ♂. Deposited.  
 1 Macaque Monkey (*Macacus cynomolgus*), ♀. Presented by W. Leckie.  
 2 Saffron Finches (*Sycalis flaveola*). Bred in the Gardens.  
 1 Lacertine Snake (*Cacopeltis lacertina*). Purchased.
8. 6 European Tree-Frogs (*Hyla arborea*). Presented by A. Leipner, Esq., F.Z.S.  
 3 Royal Pythons (*Python regius*). Received in exchange.
10. 1 Javan Peafowl (*Pavo spicifer*). Received in exchange.  
 1 European Scops Owl (*Scops giu*). Purchased.
13. 2 Arabian Gazelles (*Gazella arabica*), ♀. Presented by Capt. W. Bowden Smith, R.N.  
 1 Common Waxbill (*Estrellda cinerea*). Presented by J. C. Thorowgood, Esq.
14. 1 Macaque Monkey (*Macacus cynomolgus*). Presented by T. Hobbs, Esq.  
 2 Chinese Tree-Pies (*Dendrocitta sinensis*). Presented by Mr. Charles Rice.  
 1 Bosman's Potto (*Perodicticus potto*). Purchased. From Sulymah, S.W. coast of Africa.  
 2 Crested Colins (*Eupsychortyx cristatus*), ♂ and ♀. Purchased.  
 1 Sun-Bittern (*Europyga helias*). Deposited.
16. 1 Great Bustard (*Otis tarda*), ♀. Presented by George G. Sandeman, Esq.
17. 1 Rhesus Monkey (*Macacus erythræus*), ♀. Presented by Dr. Douglas.  
 1 Rhesus Monkey (*Macacus erythræus*), ♀. Presented by R. C. Bonsfield, Esq.  
 2 Common Starlings (*Sturnus vulgaris*). Presented by Fred. J. Barry, Esq.  
 2 Song-Thrushes (*Turdus musicus*). Presented by Fred. J. Barry, Esq.  
 2 Goldfinches (*Carduelis elegans*), ♂ and ♀. Presented by Fred. J. Barry, Esq.  
 3 Common Chaffinches (*Fringilla cælebs*), 2 ♂ 1 ♀. Presented by Fred. J. Barry, Esq.  
 2 Lesser Redpoles (*Linota rufescens*). Presented by Fred. J. Barry, Esq.  
 1 Common Linnet (*Linota cannabina*). Presented by Fred. J. Barry, Esq.  
 2 Common Greenfinches (*Ligurinus chloris*). Presented by Fred. J. Barry, Esq.  
 1 Yellow Bunting (*Emberiza citrinella*). Presented by Fred. J. Barry, Esq.  
 1 Sky-Lark (*Alauda arvensis*). Presented by Fred. J. Barry, Esq.
18. 1 Bonnet-Monkey (*Macacus radiatus*), ♀. Presented by Mrs. Bonamy Dobree.
20. 1 Bonnet-Monkey (*Macacus radiatus*). Presented by S. E. Phillips, Esq.  
 1 Scammerring's Antelope (*Gazella scammerringi*), ♂. Purchased.  
 2 Dufresne's Amazons (*Chrysotis dufresniana*). Purchased.

- Oct. 20. 2 Yellow Buntings (*Emberiza citrinella*). Purchased.  
 2 Common Linnets (*Linota cannabina*). Purchased.
21. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Presented by Mrs. Franklin.
23. 1 Bonnet-Monkey (*Macacus radiatus*), ♂. Presented by J. E. Medley, Esq.  
 1 Lesser Black-backed Gull (*Larus fuscus*). Presented by the Rev. F. H. Addams.
24. 1 Banded Ichneumon (*Herpestes fasciatus*). Purchased.  
 1 Garnett's Galago (*Galago garnetti*). Purchased.
25. 1 Mississippi Alligator (*Alligator mississippiensis*). Presented by Capt. J. H. Mortimer.  
 3 Land Hermit Crabs (*Canoëbita diogenes*). Presented by Capt. J. H. Mortimer. From Bermuda.  
 2 American May-fishes (*Pundulus majalis*). Presented by Capt. J. H. Mortimer.
27. 1 Silver Pheasant (*Euplocamus nyctemerus*), ♂. Presented by Mr. R. Moon.
28. 1 Weeper Capuchin (*Cebus capucinus*) ♀. Presented by A. Sargent, Esq.  
 4 Pied Wagtails (*Motacilla yarrellii*). Purchased.  
 1 Bosman's Potto (*Perodicticus potto*). Purchased.
31. 1 Caffer Cat (*Felis caffra*). Presented by R. Southey, Esq.
- Nov. 1. 3 Common Boas (*Boa constrictor*). Presented by W. Young, Esq.  
 3. 1 Common Weasel (*Mustela vulgaris*). Purchased.  
 4. 1 Vervet Monkey (*Cercopithecus lalandii*), ♂. Deposited.  
 1 Common Barn-Owl (*Strix flammea*). Presented by F. Bagnall, Esq.  
 5. 2 Black Bass (*Huro nigricans*). Purchased.  
 6. 2 Variegated Bitterns (*Ardetta involucris*). Purchased.  
 2 White-spotted Rails (*Rallus maculatus*). Purchased.  
 1 Sooty Rail (*Rallus rhytirhynchus*). Purchased.  
 2 Boatbills (*Cancroma cochlearia*). Purchased.  
 2 Moustache-Monkeys (*Cercopithecus cephus*). Purchased.  
 1 Common Night-Heron (*Nycticorax griseus*). Purchased.  
 1 Axis Deer (*Cervus axis*), ♂. Purchased.
7. 1 Mona Monkey (*Cercopithecus mona*), ♀. Deposited.  
 1 Malbrouck Monkey (*Cercopithecus cynosurus*), ♀. Deposited.
8. 1 Rhesus Monkey (*Macacus erythræus*). Presented by Thos. G. Anderson, Esq.  
 1 Quebec Marmot (*Arctomys monax*). Purchased.
11. 8 Silky Bower-birds (*Ptilorhynchus violaceus*). Received in exchange.  
 1 Water-Rail (*Rallus aquaticus*). Purchased.
13. 1 Pomatorhine Skua (*Stercorarius pomatorhinus*). Presented by F. L. Smith, Esq.  
 1 Woodcock (*Scolopax rusticula*). Presented by Mr. J. Pollard.  
 1 Cinereous Vulture (*Vultur monachus*). Deposited.
14. 1 Bonnet-Monkey (*Macacus radiatus*), ♀. Presented by L. H. Ruegg, Esq.  
 1 Mace's Sea-Eagle (*Haliaeetus leucoryphus*). Presented by Capt. Butler.  
 1 King Penguin (*Aptenodytes pennanti*). Purchased. From Staten Island, Cape Horn. See P. Z. S. 1879, p. 763.

- Nov. 15. 1 Banded Ichneumon (*Herpestes fasciatus*). Presented by H. L. Cockledge, Esq.  
 1 Downy Owl (*Pulsatrix torquata*). Presented by Dr. A. Stradling.  
 1 Anaconda (*Eunectes murinus*). Purchased.
17. 1 Gaimard's Rat Kangaroo (*Hypsiprymnus gaimardi*), ♂. Born in the Menagerie.  
 2 Common Siskins (*Chrysomitris spinus*). Purchased.  
 1 Reed-Bunting (*Emberiza schæneclus*). Purchased.  
 1 Pied Wagtail (*Motacilla yarrellii*). Purchased.  
 1 Little Grebe (*Podiceps minor*). Presented by A. F. Buxton, Esq.
18. 2 Barbary Falcons (*Falco barbarus*). Deposited.
20. 1 Yellow Baboon (*Cynocephalus babouin*), ♀. Presented by Cecil B. Hankey, Esq.  
 1 Common Curlew (*Numenius arquata*). Deposited.  
 1 Red-throated Diver (*Colymbus septentrionalis*). Deposited.  
 1 South-American Rat-Snake (*Spilotes variabilis*). Presented by Thomas Horrod, Esq.
21. 2 Geoffroy's Cats (*Felis geoffroyi*). Deposited.  
 2 Smooth Snakes (*Coronella levis*). Born in the Menagerie.
22. 2 Domestic Sheep (*Ovis aries*), ♀. Presented by H. Sandbach, Esq.  
 1 Collared Peccary (*Dicotyles tajacu*). Presented by H. Sandbach, Esq.
25. 1 Macaque Monkey (*Macacus cynomolgus*), ♂. Deposited.  
 1 Common Wood-Owl (*Syrnium aluco*). Presented by J. Smith, Esq.
26. 1 Torquoise Parrakeet (*Euphema pulchella*), ♀. Presented by A. Batterscombe, Esq.
27. 1 Barbary Falcon (*Falco barbarus*), ♀. Deposited.
28. 1 Reeves's Muntjac (*Cervulus reevesi*), ♂. Born in the Menagerie.
- Dec. 1. 1 Laughing Falcon (*Herpetotheres cachinnans*). Purchased.  
 1 Slow Loris (*Nycticebus tardigradus*). Purchased.  
 1 Bar-tailed Godwit (*Limosa lapponica*). Purchased.  
 1 Common Curlew (*Numenius arquata*). Purchased.
2. 2 Pin-tailed Whydah-birds (*Vidua principalis*), ♂. Presented by Capt. T. H. Bowyer.
4. 2 Pronghorn Antelopes (*Antilocapra americana*), ♂ and ♀. Purchased. See P. Z. S. 1880, p. 22.  
 2 Red River-hogs (*Potamochoerus penicillatus*), ♀. Deposited.  
 1 Elephantine Tortoise (*Testudo elephantina*). Deposited.
5. 2 Pomatorhine Skuas (*Stercorarius pomatorhinus*). Purchased.  
 2 Common Chameleons (*Chamaeleon vulgaris*). Presented by Capt. Burke.
6. 1 Mississippi Alligator (*Alligator mississippiensis*). Presented by W. G. Marshall, Esq.
7. 2 Elliot's Guinea-fowls (*Numida ellioti*). Deposited.  
 2 Slowworms (*Anguis fragilis*). Presented by W. A. H. Bernhard Smith, Esq.
11. 1 Rhesus Monkey (*Macacus erythræus*), ♀. Presented by F. J. Lightfoot, Esq.  
 1 Black-headed Jay (*Cyanocorax cyanomelas*). Purchased.
- Dec. 12. 2 Brent Geese (*Bernicla brenta*). Purchased.

- Dec. 12. 1 Bonnet-Monkey (*Macacus radiatus*), ♂. Presented by the Rev. E. C. Ince.  
 1 Ring-tailed Lemur (*Lemur catta*), ♀, Presented by F. E. Colenso, Esq.
15. 1 Puff-Adder (*Vipera arietans*). Presented by the Rev. G. H. R. Fisk, C.M.Z.S.
16. 1 Houbara Bustard (*Houbara undulata*). Purchased.
17. 1 Malbrouck Monkey (*Cercopithecus cynosurus*), ♂. Presented by the Rev. J. L. Sabungie.  
 1 Bonnet-Monkey (*Macacus radiatus*). Presented by R. Monstray Drury, Esq.
18. 1 Bodinus's Amazon (*Chrysotis bodini*). Purchased. See P. Z. S. 1880, p. 23.  
 1 Red-tailed Amazon (*Chrysotis erythrura*). Purchased. See P. Z. S. 1880, p. 23, pl. ii.  
 1 Dufresne's Amazon (*Chrysotis dufresniana*). Received in exchange.
21. 1 Vulpine Phalanger (*Phalangista vulpina*). Presented by W. T. Lackey, Esq.
22. 1 Geoffroy's Dove (*Peristera geoffroyi*). Bred in the Gardens.
24. 1 American Charr (*Salmo fontinalis*). Presented by F. Buckland, Esq., F.R.S.  
 5 Salmon-Trout (*Salmo trutta*). Presented by F. Buckland, Esq., F.R.S.  
 3 Golden Tench (*Tinca vulgaris*). Presented by F. Buckland, Esq., F.R.S.
26. 1 Vulpine Phalanger (*Phalangista vulpina*). Bred in the Gardens.
29. 2 Reed-Buntings (*Emberiza schœnichus*). Purchased.
30. 1 Macaque Monkey (*Macacus cynomolgus*), ♀. Presented by Mrs. L. C. Piggott.  
 1 Black-tailed Parrakeet (*Polytelis melanurus*). Purchased.
31. 1 Common Ocelot (*Felis pardalis*), ♂. Purchased.  
 1 Harpy Eagle (*Thrasaetus harpyia*). Purchased.  
 2 Naked-throated Bell-birds (*Chasmorhynchus nudicollis*). Purchased.  
 1 Tamandua Ant-eater (*Tamandua tetradactyla*). Purchased.

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